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WATER POLLUTION SURVEILLANCE SYSTEM. VOLUME 7. MISSOURI RIVER BASIN

Public Health Service
Washington, D. C.

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MISSOURI RIVER BASIN
Volume 7

Public Health Service

Water Pollution Surveillance System

ANNUAL COMPILATION OF DATA
October 1, 1962 - - - September 30, 1963

A Federal, State and Local cooperative report on water pollution surveillance of surface waters at selected locations throughout the United States

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U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service, Division of Water Supply and Pollution Control
Washington, D.C. 20201

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Public Health Service Publication No. 663 (1958 Edition)

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Statistical Summary of Selected Data, October 1, 1957–September 30, 1958
Public Health Service Publication No. 663—Supplement 1

National Water Quality Network
Annual Compilation of Data, October 1, 1958–September 30, 1959
Public Health Service Publication No. 663 (1959 Edition)

National Water Quality Network
Annual Compilation of Data, October 1, 1959–September 30, 1960
Public Health Service Publication No. 663 (1960 Edition)

National Water Quality Network
Plankton Population Dynamics, July 1, 1959–June 30, 1961
Public Health Service Publication No. 663—Supplement 2

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Public Health Service Publication No. 663 (1961 Edition)

National Water Quality Network
Annual Compilation of Data, October 1, 1961–September 30, 1962
Public Health Service Publication No. 663 (1962 Edition)

ACKNOWLEDGMENT

To increase the usefulness of the water quality data, annual compilations since 1958, including this one, have presented preliminary and unadjusted flow data for gaging stations at or near most of the Public Health Service Water Pollution Surveillance System sampling points. Final data may be obtained directly from the agency concerned. Any studies using the provisional flow data herein compiled should verify the data prior to completion of reports on such studies. For making the flow information available for this publication, grateful acknowledgment is made by the Public Health Service to:

The International Boundary and Water Commission,
United States and Mexico

The International Joint Commission, United States and Canada

The U.S. Department of the Interior
Bureau of Reclamation • Geological Survey

The U.S. Department of the Army
Corps of Engineers • Lake Survey

FOREWORD

This is the sixth annual compilation of data from the Public Health Service Water Pollution Surveillance System (formerly the National Water Quality Network). During this year, the System was increased from 122 to 128 stations. In order to provide data in a form more useful for local or regional water pollution control officials and their staffs, the present compilation is published in 11 separate volumes. The surveillance data reported herein reveal additional findings on pesticides and other organic chemicals in surface waters and on trends in radioactivity and other areas.

The Public Health Service gratefully acknowledges the assistance to our Surveillance System of the participating local, State and Federal Government agencies and private industry. The success of this program depends, in a large measure, upon their continued interest and support.

GORDON E. MCCALLUM, D. Sc.,
Assistant Surgeon General,
Chief, Division of Water Supply and Pollution Control

VOLUME 1

Northeast Basin

CONNECTICUT RIVER
at Enfield Dam, Conn.
below Northfield, Mass.
at Wilder, Vt.

HUDSON RIVER
below Poughkeepsie, N.Y.

LAKE ERIE
at Buffalo, N.Y.

MERRIMACK RIVER
above Lowell, Mass.

RARITAN RIVER
at Perth Amboy, N.J.

ST. LAWRENCE RIVER
at Massena, N.Y.

VOLUME 2

North Atlantic Basin

DELAWARE RIVER
at Philadelphia, Pa.
at Trenton, N.J.
at Martins Creek, Pa.

POTOMAC RIVER
at Washington, D.C.
at Great Falls, Md.
at Williamsport, Md.

SCHUYLKILL RIVER
at Philadelphia, Pa.

SHENANDOAH RIVER
at Berryville, Va.

SUSQUEHANNA RIVER
at Conowingo, Md.
at Sayre, Pa.

VOLUME 3

Southeast Basin

APALACHICOLA RIVER
at Chattahoochee, Fla.

CHATTAHOOCHEE RIVER
at Columbus, Ga.
at Lanett, Ala.
at Atlanta, Ga.

ESCAMBIA RIVER
at Century, Fla.

ROANOKE RIVER
at John H. Kerr Dam and
Reservoir, Va.

SAVANNAH RIVER
at Port Wentworth, Ga.
at North Augusta, S.C.

TOMBIGBEE RIVER
below Columbus, Miss.

VOLUME 4

Western Great Lakes and Lake Erie Basins

WESTERN GREAT LAKES

DETROIT RIVER
at Detroit, Mich.

LAKE MICHIGAN
at Gary, Ind.
at Milwaukee, Wis.

LAKE SUPERIOR
at Duluth, Minn.

ST. CLAIR RIVER
at Port Huron, Mich.

ST. MARYS RIVER
at Sault Ste. Marie, Mich.

LAKE ERIE BASIN

CUYAHOGA RIVER
at Cleveland, Ohio

MAUMEE RIVER
at Toledo, Ohio

VOLUME 5

Ohio and Tennessee River Basins

OHIO RIVER BASIN

ALLEGHENY RIVER
at Pittsburgh, Pa.

CUMBERLAND RIVER
at Clarksville, Tenn.

KANAWHA RIVER
at Winfield Dam, W. Va.

LITTLE MIAMI RIVER
at Cincinnati, Ohio

MONONGAHELA RIVER
at Pittsburgh, Pa.

OHIO RIVER
at Cairo, Ill.
at Evansville, Ind.
at Louisville, Ky.
at Cincinnati, Ohio
at Huntington, W. Va.
below Addison, Ohio
at Toronto, Ohio

WABASH RIVER
at New Harmony, Ind.

TENNESSEE RIVER BASIN

CLINCH RIVER
above Kingston, Tenn.
at Clinton, Tenn.

TENNESSEE RIVER
at Pickwick Landing, Tenn.
at Bridgeport, Ala.
at Chattanooga, Tenn.
at Lenoir City, Tenn.

VOLUME 6

Upper Mississippi River Basin

ILLINOIS RIVER
near Grafton, Ill.
at Peoria, Ill.

MISSISSIPPI RIVER
at Cape Girardeau, Mo.
at East St. Louis, Ill.
at Burlington, Iowa
at Dubuque, Iowa
at Lock and Dam 3 below St. Paul, Minn.

RAINY RIVER
at Baudette, Minn.
at International Falls, Minn.

RED RIVER (NORTH)
at Grand Forks, N. Dak.

VOLUME 7

Missouri River Basin

BIG HORN RIVER
at Hardin, Mont.

BIG SIOUX RIVER
below Sioux Falls, S. Dak.

KANSAS RIVER
at DeSoto, Kans.

MISSOURI RIVER
at St. Louis, Mo.
at Missouri City, Mo.
at Kansas City, Kans.
at St. Joseph, Mo.
at Omaha, Nebr.
at Yankton, S. Dak.
at Bismarck, N. Dak.
at Williston, N. Dak.

NORTH PLATTE RIVER
above Henry, Nebr.

PLATTE RIVER
above Plattsmouth, Nebr.

SOUTH PLATTE RIVER
at Julesburg, Colo.

YELLOWSTONE RIVER
near Sidney, Mont.

VOLUME 8

Southwest-Lower Mississippi River Basin

ARKANSAS RIVER
at Pendleton Ferry, Ark.
at Little Rock, Ark.
near Forth Smith, Ark.
near Ponca City, Okla.
at Coolidge, Kans.

MISSISSIPPI RIVER
at New Orleans, La.
at Delta, La.
at Vicksburg, Miss.
at West Memphis, Ark.

OUACHITA RIVER
at Bastrop, La.

RED RIVER (SOUTH)
at Alexandria, La.
at Bossier City, La.
at Index, Ark.
at Denison, Tex.

VERDIGRIS RIVER
at Nowata, Okla.

VOLUME 9

Colorado River and Western Gulf Basins

COLORADO RIVER BASIN

ANIMAS RIVER
at Cedar Hill, N. Mex.

COLORADO RIVER
at Yuma, Ariz.
above Parker Dam, Ariz.-Calif.
near Boulder City, Nev.
at Page, Ariz.
at Loma, Colo.

GREEN RIVER
at Dutch John, Utah

SAN JUAN RIVER
at Shiprock, New Mex.

WESTERN GULF BASIN

RIO GRANDE
at Brownsville, Tex.
at Laredo, Tex.
at El Paso, Tex.
below Alamosa, Colo.

SABINE RIVER
near Ruliff, Tex.

VOLUME 10

Pacific Northwest and Alaska Basins

PACIFIC NORTHWEST

CLEARWATER RIVER
at Lewiston, Idaho

COLUMBIA RIVER
at Clatskanie, Oreg.
at Bonneville, Oreg.
at McNary Dam, Oreg.
at Pasco, Wash.
at Wenatchee, Wash.
at Northport, Wash.

PEND OREILLE RIVER
at Albeni Falls Dam, Idaho

SNAKE RIVER
at Ice Harbor Dam, Wash.
at Wawawai, Wash.
at Payette, Idaho

SPOKANE RIVER
at Post Falls Dam, Idaho

WILLAMETTE RIVER
at Portland, Oreg.

YAKIMA RIVER
at Richland, Wash.

ALASKA BASIN

CHENA RIVER
at Fairbanks, Alaska

SHIP CREEK
at Anchorage, Alaska

VOLUME 11

California and the Great Basins

CALIFORNIA BASIN

KLAMATH RIVER
near Keno, Oreg.

SACRAMENTO RIVER
at Greens Landing above Courtland, Calif.

SAN JOAQUIN RIVER
near Vernalis, Calif.

GREAT BASIN

BEAR RIVER
above Preston, Idaho

TRUCKEE RIVER
at Calif.-Nev. Border
at Farad, Calif.

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ANALYTICAL AND FLOW DATA INDEX

STATION	General Description Trace Elements, Strontium 90	Radioactivity Determinations	Plankton Populations	Organic Chemicals	Chemical, Physical and Bacteriological Analyses	Flow Data
	Page No.	Page No.	Page No.	Page No.	Page No.	Page No.
Big Horn River at Hardin, Mont	25-26	27	28-29	—	30-31	32
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Kansas River at DeSoto, Kans	41-42	43	44-45	46	47	48
Missouri River at St. Louis, Mo	49-50	51	52-53	54	55-56	57
at Missouri City, Mo	59-60	61	62-63	64	65-66	67
at Kansas City, Kans	69-70	71	72-73	74	75-76	77
at St. Joseph, Mo	79-80	81	82-83	84	85-86	87
at Omaha, Nebr	89-90	91	92-93	94	95-96	97
at Yankton, S. Dak	99-100	101	102-103	104	105-106	107
at Bismarck, N. Dak	109-110	111	112-113	114	115-116	117
at Williston, N. Dak	119-120	121	122-123	124	125-126	127
North Platte River above Henry, Nebr	129-130	131-132	134-135	133	136-137	138
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South Platte River at Julesburg, Colo	147-148	149	150-151	152	153-154	155
Yellowstone River near Sidney, Mont	157-158	159	160-161	162	163-164	165

Dash (—) indicates no determination made.

THE PUBLIC HEALTH SERVICE

Water Pollution Surveillance System

The Public Health Service program for providing fundamental information on the quality of the Nation's waters stems from Public Law 660, approved July 9, 1956, as amended by Public Law 87-88, July 20, 1961. Section 4(c) thereof states: ". . . the Secretary (of Health, Education, and Welfare) shall in cooperation with other Federal, State, and local agencies having related responsibilities, collect and disseminate basic data on chemical, physical, and biological water quality insofar as such data or other information relate to water pollution and the prevention and control thereof."

To fulfill this responsibility, the Public Health Service Water Pollution Surveillance System collects, interprets, and disseminates:

a. Information on changes in water quality at key points in river systems, as such quality may be affected by changes in water use and development.

b. Continuous information on the nature and extent of pollutants affecting water quality.

c. Data which will be useful in the development of comprehensive water resources programs.

d. Data which will assist State, interstate, and other agencies in their water pollution control programs, and in the selection of sites for legitimate water uses.

Some 50 sampling stations were established when the program started, October 1, 1957. By September 30, 1963, the number had grown to 128.

Each sampling location satisfies one or more of the following criteria:

a. Major waterways used for public water supply, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other legitimate uses.

b. Interstate, coastal, and international boundary waters.

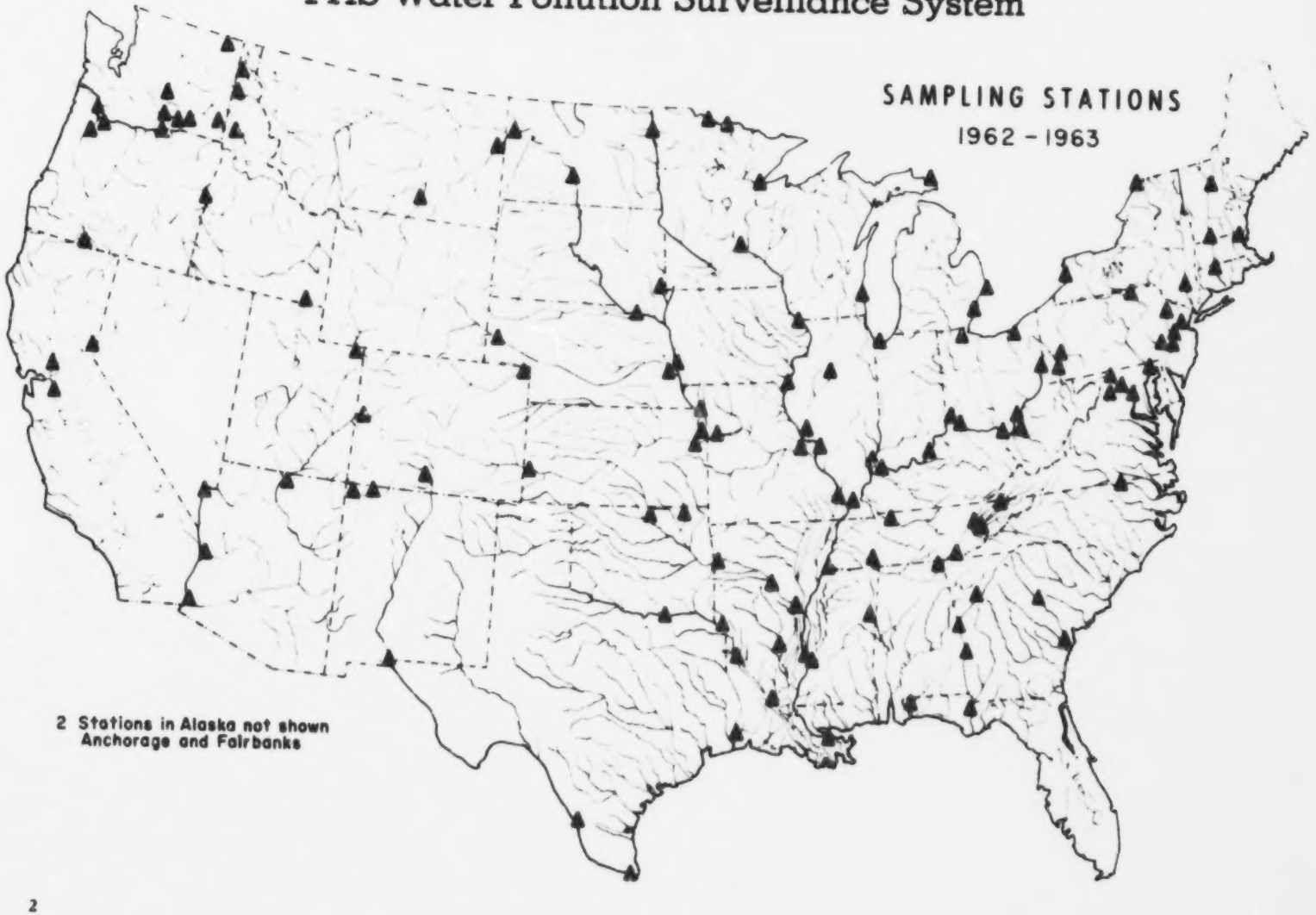
c. Waters on which activities of the Federal Government may have an impact.

Sampling station sites are fixed only after consultation with local, State, Federal and other agencies having related interests.

Active local participation is important in this operation. It assures maximum development of all information valuable both locally and nationally. Program costs are shared by the Federal Government and State and local agencies, those of the latter through contributions of laboratory and sampling manpower. Specifically, the State and local agencies perform certain of the conventional chemical analyses and collect samples for the newer, more complex examinations. The Public Health Service, in turn, performs the more complex determinations and makes the results available to the participants and to the public. In addition, the consultation, training facilities, and other resources of the Public Health Service are available to the cooperating agencies.

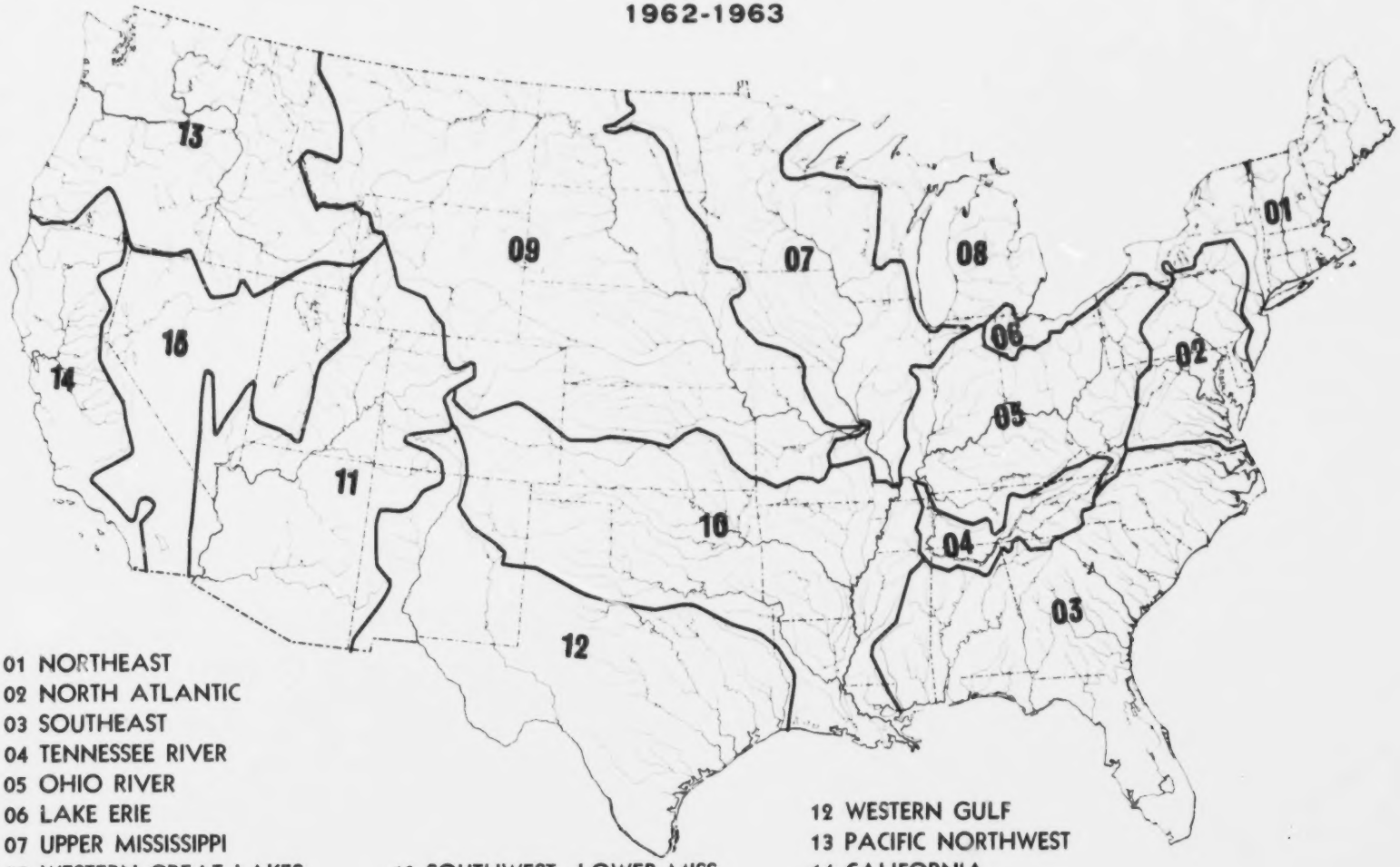
Locations of sampling stations in operation as of September 30, 1963, are shown on page 2. Descriptions of the stations, participating agencies, and other pertinent information are presented with the station data.

PHS Water Pollution Surveillance System



MAJOR RIVER BASINS OF THE UNITED STATES

1962-1963



01 NORTHEAST
02 NORTH ATLANTIC
03 SOUTHEAST
04 TENNESSEE RIVER
05 OHIO RIVER
06 LAKE ERIE
07 UPPER MISSISSIPPI
08 WESTERN GREAT LAKES
09 MISSOURI RIVER
10 SOUTHWEST—LOWER MISS.
11 COLORADO RIVER
12 WESTERN GULF
13 PACIFIC NORTHWEST
14 CALIFORNIA
15 GREAT BASIN

Only after careful screening of needs in water resource development was a pattern set for analyses of water samples.
All System samples are examined for:

a. Radioactivity.
   (1) Gross alpha.
   (2) Gross beta.
   (3) Strontium 90.
b. Plankton populations.
c. Coliform organisms.
d. Organic chemicals.
e. Biochemical, chemical, and physical measurements, including biochemical oxygen demand (BOD), dissolved oxygen (DO), chemical oxygen demand (COD), chlorine demand, ammonia nitrogen, hydrogen ion concentration (pH), color turbidity, temperature, alkalinity, hardness, chloride, sulfate, phosphates and total dissolved solids.
f. Sodium, potassium, fluoride and trace elements.

Samples for groups c and e were collected and analyzed weekly. Samples for organic chemicals were collected and analyzed monthly and plankton organism examinations were conducted semimonthly. Water samples for analysis of suspended and dissolved gross alpha and beta radioactivity were submitted weekly. Strontium 90 analyses were made on composites of weekly samples accumulated over 3-month periods. Sodium, potassium, fluoride, and trace metals were also determined on 3-month composites of weekly samples. New parameters which are developed and found significant will be included as the program continues.

Analytical Methods and Reliability of Data

The physical, chemical and biochemical data documented in this publication are the result of efforts of the cooperating agencies. In general, about half of these measurements were contributed by their laboratories. Specifically, all measurements reported for temperature, pH, DO, BOD, COD, chlorine demand and ammonia nitrogen were performed by the participants at the sample collection point. In addition, about 45 of the participating groups regularly perform all or most of the determinations for the remaining parameters included in the data. Whenever possible, analyses for stable constituents not completed by the participants are completed in the central Water Quality laboratories. While individual laboratories make minor modifications to meet local conditions, the methods used in most cases are those published in the 11th edition, "Standard Methods for the Examination of Water and Wastewater" (22). For uniformity, the chlorine demand test is reported on the basis of the starch-iodide titration procedure, and the chemical oxygen demand test is restricted to the use of 0.025 N reagents.

To assure continued reliability in the published data, frequent analysis of reference samples are made by each cooperating laboratory as an integral part of the overall program. Periodically a synthetic standard sample is provided to each participant for reference analysis. The reported results are reviewed. Any significant errors are called to the attention of the reporting laboratory and, after the cause of the errors has been determined, the previously submitted data are either corrected or discarded. From these findings, the analyses reported in this compilation are believed to be accurate to ± 10 percent of the reported values.

The analytical methods used by the Public Health Service laboratories are described in the discussion of water quality parameters which follows, and are covered by references listed in the Bibliography.

Water Pollution Parameters

In the assessment of water pollution, all of the legitimate purposes for which raw waters can be used, and which may be affected by pollution, must be considered. These may range from the minimum requirements for navigation to the ultimate in water quality demanded for certain industrial processing. Standards differ considerably, therefore, according to water use.

For domestic use, water must be free of disease organisms, clear, colorless, taste- and odor-free, and have a relatively low dissolved mineral content. Agricultural water is judged primarily on its mineral content, especially with respect to the ratio of sodium to other cations, and the presence of boron. Water for fish propogation and recreational purposes must be relatively free from domestic and industrial pollution and must be able to sustain an active flora of the smaller aquatic organisms on which fish and wildlife feed. Industrial water quality demands run the gamut from the complete absence of minerals to a requirement of low temperature, the critical factor in water used for cooling. The effects of radioactive materials on these uses have not yet been fully appraised.

The various laboratory examinations made as part of this program are discussed below.

Radioactivity

Radioactivity, long recognized as a water contaminant from natural sources, has continued to grow in importance and health significance with the development of nuclear energy for both military and peaceful uses. Consequently, levels must be measured continually as new sources are established.

Gross alpha and beta measurements are made on both suspended and dissolved solids in the raw surface water samples. The total radioactivity in the dissolved solids provides a rough measure of the levels which may be found in a treated water, where water treatment removes substantially all of the suspended matter.

Beta activity levels generally reflect the variable contamination resulting from fallout and discharges from nuclear energy installations, institutions utilizing radioactive materials, and other manmade sources. The trend of gross beta radioactivity in samples received from 47 of the Public Health Service Water Pollution Surveillance System stations operating since 1957 is presented in Figure 1. During the first three quarters of the 1962 water year, renewed weapons testing resulted in a rise in gross beta radioactivity in surface waters of the United States. During the sec-

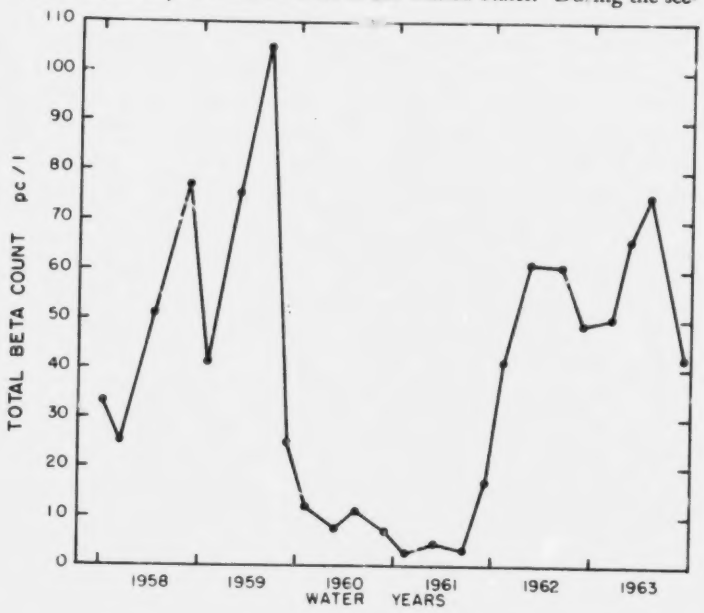


FIGURE 1. GROSS BETA RADIOACTIVITY IN THE SURFACE WATERS OF THE UNITED STATES.

ond and third quarter of water year 1963, the national average activity reached a maximum of 75 pico curies per liter and then decreased. Beta levels have remained well below the Public Health Service Drinking Water Standard of 1,000 pc/l or $\mu\mu$c/l (26).

Alpha levels reflect largely the activity added by uranium and thorium daughters. The waters of the United States can be characterized in a general way with respect to gross alpha radioactivity content. Gross alpha levels average less than 1 pc/l in east coast, Appalachian, Great Lakes, and Pacific Northwest States. On the Colorado Plateau, and along the eastern slope of the Rocky Mountains, natural radioactivity, principally from mineral deposits, results in average concentrations of about 20 pc/l.

Gross levels are most informative in ascertaining long-term trends or changes in water quality. By themselves, however, they are of limited value in assessing radiation exposure. Where gross results are consistently over the maximum permissible concentrations for mixed fission products, the identity of the specific radionuclides involved must be established.

Because of its significance in the environment, the concentration of strontium 90 in the total solids is also reported. In water year 1963, strontium 90 levels ranged from 0.4 to 11.3 pc/l. The national average reached a high of 3.8 pc/l during the fourth quarter (July, August, September 1963). Highest levels were in the north-central area of the coterminous United States where the average was approximately 6 pc/l for this quarter. All averages were less than the limit (10 pc/l) specified in the Public Health Service Drinking Water Standards (26). The levels of strontium 90 activity in waters of the United States since the first quarter of the 1959 calendar year are presented graphically in figure 2.

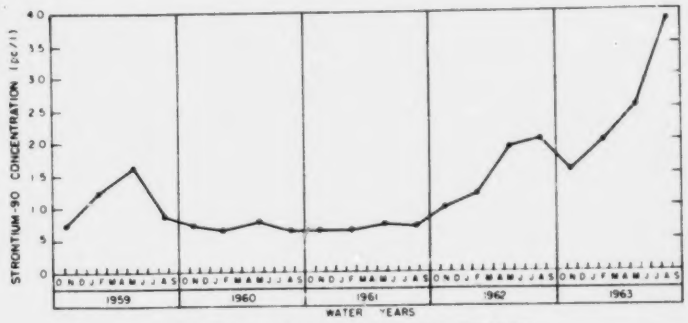


FIGURE 2 STRONTIUM-90 IN SURFACE WATER OF THE UNITED STATES

Plankton Populations

Geographical distribution of algae and other planktonic organisms are influenced by geologic and climatic factors, and result in distinctive plankton populations in different areas. Within each region, population changes are directly related to temperature, and the nature and concentration of organic and mineral substances which enter the aquatic environment. These substances may come from domestic sewage, industrial wastes, runoff from agricultural lands, irrigation discharges, or native rocks and soils. They may be basic nutrients, highly toxic, or metabolically inert. Planktonic organisms differ greatly in their sensitivity to the nutrient and toxic substances which are present. Some thrive only in water which is relatively free of nutrients while others multiply rapidly in water which has been greatly enriched. Large numbers of tolerant algae usually develop in waters containing abundant supplies of inorganic nitrogen and phosphorus resulting from the mineralization of domestic sewage. These nuisance populations may clog filters in municipal water plants, and produce objectional tastes and odors.

On the other hand, plankton populations may be eradicated by the introduction of toxic organic or mineral wastes. This is not desirable because some plankton organisms play essential roles in providing food and oxygen for higher forms of aquatic life, and in cleansing polluted waters.

Beginning at low nutrient levels, progressive enrichment of waters results in an increase in the variety and abundance of the plankton. However, as higher levels of enrichment are attained, the increase in total numbers of organisms is accompanied by a decrease in the number of kinds of organisms. This change is typical in populations which have been subjected to the wide spectrum of substances being introduced into

surface water in ever increasing amounts. Plankton counts, which provide information concerning the variety and abundance of organisms, are useful in detecting changes in the concentration of organic and mineral substances which enter water supplies.

METHODS OF ANALYSIS

Plankton samples are collected semimonthly at each station. A sample consists of 3 liters of raw water taken directly from the stream or from a treatment plant intake. Preservation is effected at the time of collection by the use of 30 ppm merthiolate.

Three types of analyses are performed:

1. Rotifers, crustacea, and other micro invertebrates are removed from a 1-liter aliquot of the sample by settling 24 hours. The sediment is placed in a special slide, 80 x 50 x 2 mm., and the organisms are enumerated under a compound microscope at 100× magnification. The counts are reported as organisms per liter.

2. A "total live algae" count is obtained from 1 milliliter of the sample by scanning two 50-mm. strips on a Sedgwick-Rafter slide using 200× magnification and a Whipple micrometer disc. An appropriate correction factor is used to convert the counts to units per milliliter. Each single cell or natural aggregate of cells (colony) occupying up to 300 square microns (μ^2) is counted as 1 unit. Large colonies are enumerated according to a modified areal-unit method in which aggregates occupying 300–1,000μ^2 are counted as 2 units, those occupying 1,000–2,500μ^2 as 3 units, those 2500–5000μ^2 as 4 units, and those over 5,000μ^2 as 5 units. About 95 percent of cell aggregates fall into size 1 or 2.

3. Identification and proportional census of diatom species are done from sediment obtained by settling 1 liter of the sample 48 hours. A small aliquot of the sediment is placed on a No. 1 coverglass and dried on a warming table. The sediment is ashed on the coverglass by heating on a hotplate, and permanent slides are made with hyrax mounting medium. Counts are made with 90× apochromatic oil immersion objectives and 10× oculars containing a Whipple micrometer disc. Random strip counts are made until the total number of units reaches 200 to 300. The same areal units are used as described for Sedgwick-Rafter counting.

Organic Chemicals

The Nation's water resources continue to receive increasing quantities of organic contaminants. Since 1940 the chemical industry, particularly in the manufacture of synthetic and petrochemicals, has experienced an enormous expansion that shows every sign of continuing. Each year millions of pounds of synthetic detergents, insecticides, herbicides, and similar domestic products find their way into our streams from household sewers, industrial waste discharges, and land runoff.

Effective and economical treatment methods for most of the complex organic materials remain to be developed. Even where treatment exists, residues may remain in sufficient quantity to cause water damage. These stable residues persist through sewage treatment, biological and chemical action of the stream, and water treatment processes, and finally reach the consumer in drinking water.

The presence of some of these materials, even at concentrations considerably less than 1 part per million, may impair water quality, most noticably in production of tastes and odors. Fishflesh tainting, also quickly noticed by the consumer, is another damage. Effects on water treatment, many of which are ill-defined at present, and impairment of water quality for industrial uses are being reported with increasing frequency. Essentially nothing is known of the possible immediate or long-term effects of these materials on human health. Such information is urgently needed.

The usual sanitary analyses are not effective in measuring these newer organic contaminants. Yet it is essential to know something of their concentrations and character. A method known as the "Carbon Adsorption Technique," developed by the Public Health Service, permits the concentration of these organic compounds from a large volume of water. Elution of the adsorbed materials with organic solvents, followed by chemical separation and testing, provides useful information concerning organic pollution and for assaying river systems for these substances.

Following continuous flow of about 5,000 gallons of water through the carbon adsorption column over a 7- to 10-day period at 0.5 gpm, material on the carbon adsorption column is extracted with two solvents, chloroform and alcohol. The residues are weighed. The concentration of these materials in the water sampled is then computed. See Explanation of Analytical Data, page 21.

CHLOROFORM EXTRACTS

The organic materials recovered from the carbon adsorption column by chloroform is very complex. It is desirable to separate the crude extract into certain broad chemical classes, and this can be done on the basis of solubility differences. The various classes or groups and their general significance are discussed briefly below.

Ether Insolubles

This group is usually a brown, humuslike powder, apparently composed to a large extent of carboxylic acids, ketones, and alcohols of complicated structure. Origin of the group, which is an indicator of "old" pollution, is believed to be partially oxidized sewage and industrial wastes. For example, the Ohio River at Cincinnati has been exposed to much industrial and sewage pollution, and hence large amounts of ether insoluble materials are found. Streams with little or no pollution history have little or no ether insolubles. Chloroform extracts contain from 0 to 30 percent of ether insoluble material.

Water Solubles

These substances are largely acidic and undistillable at moderate temperatures, but their solubility in ether indicates that the molecules are smaller and probably simpler than the ether-solubles. On the other hand, their water solubility practically requires the presence of several functional groups, such as hydroxy-acid, keto acid, and keto-alcohol. Such compounds probably originate from partial oxidation of hydrocarbons or they may be natural substances. They have very little odor. These materials usually make up 10 to 20 percent of the total extract.

Weak Acids

This group is characterized by being removed from ether solution with sodium hydroxide but not with sodium bicarbonate. Phenols are the best known weak acids, and if present in the water, appear in this group. Other weakly acidic compounds include certain enols, imides, sulfonamides, and some sulfur compounds. This group of materials also occurs in nature. The weak acids are odorous, and commonly constitute 5 to 20 percent of the chloroform extract.

Strong Acids

These acids are usually carboxylic acids such as acetic, benzoic, salicylic or butyric. Although classified as strong in reference to carbonic acid, they are actually weak when compared with a mineral acid, such as sulfuric. Many of the compounds are used industrially, but may also be produced by natural processes, such as fermentation. Some of the materials are highly odorous. This fraction makes up from 5 to 20 percent of the total. The significance of the strong acids can be interpreted only in the light of stream pollution conditions.

Bases

These compounds are organic amines. Such materials as aniline and pyridine are amines of commerce. Lower amines may occur as a result of decomposition. Although odorous, the low concentrations found are not likely to cause objectionable conditions. However, in the case of specific amine-containing wastes the compounds can be of considerable significance. Generally, only 1 or 2 percent of the total extract is made up of the bases.

Neutrals

This group frequently constitutes the major portion of the chloroform extract. Neither basic nor acidic, the materials are less reactive and tend to persist in streams longer than many other types. Hydrocarbons, aldehydes, ketones, esters, and ethers are examples of neutral materials. The group lends itself to further fractionation by means of chromatographic separation into aliphatic, aromatic, and oxygenated subgroups:

Aliphatics: This portion represents petroleum type hydrocarbons in a considerable state of purity, and is usually made up of mineral oil type of material. The percentage of aliphatics present yields important information about the possible source of pollution, since petroleum is the most likely source.

Aromatics: These are principally the coal tar hydrocarbons such as benzene, toluene, and a host of others, and their presence in any significant amount is a reliable indication of industrial pollution. Further, the materials can frequently be identified by infrared spectrophotometry. Some aromatic compounds which have been found in our rivers—and in our drinking water—include DDT, aldrin, endrin, dieldrin, phyenyl ether, orthonitrochlorobenzene, pyridine, phenol, and others. The materials are highly odorous, and may also be toxic. Their appearance in any quantity as pollutants should receive careful evaluation.

Oxygenated compounds (Oxys): These are the neutral compounds containing oxygen, such as aldehydes, ketones and esters. They may have originated by direct discharge or may represent oxidation products from both natural and industrial materials. They help to indicate the "age" of the pollution, since pollution exposed to oxidation forces for a long time would be expected to contain large amounts of oxys. The oxy materials are odorous.

Losses

Manipulative losses inherent in this type of separation may amount to 10 to 15 percent. Losses greater than this may indicate that volatile components were lost from the sample. Such volatiles may have significance as pollutants.

ALCOHOL EXTRACTS

The alcohol extractables generally consist of materials more polar than the chloroform extractables. They often contain synthetic detergents, carboxylic acids and humic materials which may originate naturally or from oxidized products of domestic and industrial wastes. These classes of substances are not quantitatively recovered by the alcohol extraction. For example, this extraction recovers only 20 to 30 percent of the synthetic detergents present. On waters of mixed industrial and domestic pollution, the chloroform and alcohol extractables may be about equal. On some streams where the industrial pollution is rather low and much natural pollution or sewage is present, the alcohol extractables may exceed the chloroform extractables by a factor of 4 to 6.

The alcohol extract is usually only partially soluble in water and most ordinary solvents. Very little further chemical separation of this material is currently practical. However, tests have revealed that synthetic detergents may make up 1 to 12 percent of the alcohol extract.

OTHER TESTS

Infrared spectra are routinely run on the total chloroform and alcohol extracts as well as the neutral, aliphatic, aromatic and oxygenated groups which are usually the most significant. Spectra of other groups are obtained when there is an indication that they may be significant. These spectra reveal something of the chemical structure of the materials, indicate differences and in certain instances provide a definite identification. In the case of the alcohol extracts, the infrared spectra will indicate the presence of synthetic detergents if the materials constitute a significant portion.

Thin layer chromatography has been applied successfully to the resolution of the aromatic and basic fractions of CCE. Gas chromatographic equipment with flame ionization, electron-capture and microcoulometric detectors have also been used freely in the identification of specific substances.

COMPOSITE ANALYSIS

Samples from certain locations have been selected for analysis on a quarterly composite basis. Stations that have collected at least 12 samples in a nearly consecutive manner and averaged 100 ppb. or less of chloroform extractables are selected for such analysis when certain other conditions are met. However, samples falling in this category are analyzed individually when the recovery of the chloroform extract is exceptionally high and/or it is unusual in its infrared spectrum or some other physical characteristic.

SPECIFIC IDENTIFICATIONS

Information about specific organic substances which were identified in carbon adsorption samples is given on the second page of the group associated with each station. The increased number of pesticide and other specific compounds identified, as compared to previous years, is partly associated with greater sensitivity in analytical methodology and may be partly a reflection of the increasing usage of these substances in the total environment.

Chemical, Physical, and Bacteriological Examinations

The various biochemical, chemical, physical and bacteriological examinations generally performed by the participating laboratories are discussed below.

AMMONIA NITROGEN AND CHLORINE DEMAND

The cost of water treatment for domestic use is affected by the consumption of chlorine, with ammonia nitrogen being responsible for a large portion of the chlorine demand. The greater this demand, the more expensive is the treatment. The ammonia may originate from unstabilized domestic pollution, from industrial waste discharges, from run-off containing fertilizers used in farming operations or from all three. The presence of measurable quantities of nitrogen compounds, not necessarily ammonia, is also an indication of the fertility of the stream toward both macro- and micro-biological forms.

COLOR

Color in domestic water supplies is undesirable. Its removal in the water treatment process, whether it be from natural or industrial sources, may require large doses of chemicals and be expensive.

DISSOLVED OXYGEN, BIOCHEMICAL AND CHEMICAL OXYGEN DEMANDS

Biochemical processes, in which aquatic organisms attack and stabilize the organic matter present, require dissolved oxygen. If unstable oxidizable organic matter is present in excess, the organisms will multiply rapidly, consuming the oxygen present in the water, and bring about a foul, septic stream condition. The dissolved oxygen level thus serves to indicate the biochemical activity of the stream. High activity, resulting in low dissolved oxygen levels, will drive out game fish in favor of scavengers. Very low or zero oxygen levels will kill all fish and aquatic organisms dependent on dissolved oxygen for life. Temperature and reaeration rates also affect dissolved oxygen levels.

The 5-day biochemical oxygen demand (BOD) indicates the degree of unstabilized organic pollution from either domestic or industrial sources, to which the stream is being subjected. A significant demand will affect the fish and macroorganism population, and waters carrying a high BOD seldom contain game fish. On the other hand, game fish will thrive in streams in which the oxygen demand has been stabilized, as this condition is usually favorable for the growth of organisms on which fish feed.

The chemical oxygen demand analysis serves to support the findings of the biochemical oxygen demand test. It too may indicate to what extent the waste load of the stream has been stabilized, or it may indicate the presence of organic and inorganic pollution which is not readily oxidized by biological processes. Because the chemical oxygen demand can be determined quickly in comparison to the biochemical oxygen demand, the establishment of a correlation between the two parameters serves to reduce the number of the latter determinations required. The chemical demand results are nearly always higher than the biochemical demand.

TEMPERATURE

Temperature is particularly important to conservation and industry. A few degrees elevation in temperature due to cooling water discharges may seriously limit the capacity of a stream to support fish life. Also, high water temperatures increase the cost of cooling water for

industrial operations. Cooling towers and other equipment for handling cooling water must be engineered to the temperature levels normally encountered.

MINERAL CONSTITUENTS

These determinations include alkalinity, hydrogen-ion concentrations (pH), hardness, chlorides, sulfates, and total dissolved solids. The pH indicates whether water is acidic or alkaline, corrosive or passive. Alkalinity is a measure of the neutralization reserve present, or the extent to which the water can resist a change from an alkaline to an acid condition upon addition of acidic chemicals. This information is important to the water treatment plant operator and to many other water users.

Hardness is not only a measure of the soap consuming property, but is also of importance in the treatment of boiler waters, where removal of hardness is one of the most important functions. Chloride, sulfate, and total dissolved solids add further information on the gross dissolved mineral content carried by the stream. These are of great importance when considering the taste or palatability of water. They are also important when the water is being demineralized for specific industrial processes, since the cost of demineralization is a direct function of the dissolved solids content of the water. In addition, waters of high saline content are less desirable and may at times even be unfit for municipal, irrigation, and other uses.

TURBIDITY

Turbidity of water is due to the suspension of clay, silt, finely divided organic matter, microscopic organisms, and other similar materials. Its presence is of particular importance in water treatment processes and in the propagation of fish and other aquatic life.

COLIFORM ORGANISMS

Information about fecal pollution is essential to water quality measurements. Data on coliform bacteria, used as indicators of pollution, help to point up the trends in the effectiveness of treatment of domestic waste discharges.

The delayed-incubation membrane filter technique is used for the coliform examination, instead of the fermentation tube (MPN) method. The latter necessitates transport of water samples to the Water Quality Section laboratory for examination, with a time lapse between collection and examination that can significantly change their microbial content. Also, some of the many other bacteria present in raw water might overgrow or otherwise inhibit the demonstration of the coliform organisms. In the delayed-incubation membrane filter procedure, the bacteria are filtered out from the fluid samples immediately after collection and the filters sent to the Water Quality Section laboratory on a preservative medium. In the laboratory the membrane filters carrying the bacteria are transferred to a medium selective for coliform organisms, then incubated and counted. The resulting counts approach very closely the actual numbers of coliform bacteria present in the water samples at the time of collection.

Unusual populations of coliform bacteria may mean increased pollution and ensuing loss of water quality. The Public Health Service Water Pollution Surveillance System studies and reports the trends in sewage pollution on streams as indicated by the trends of coliform counts.

Trace Elements and Other Determinations

This year's trace element data differ somewhat from data reported in previous compilations in that the manner of obtaining the data has been modified and the program of elements measured altered. The trace metals measurements are now obtained from a 3.4 meter direct reading spectrograph. Tin, antimony, and bismuth have been discontinued; arsenic, boron, phosphorus, aluminum, and strontium have been added. Increased sensitivity for several elements has been attained, especially zinc, manganese, and beryllium, resulting in fewer indeterminate values.

Twice during the year, 3-month composites of the weekly samples were prepared and subjected to analysis. Examinations covered those elements included in the Public Health Service Drinking Water Standards (*26*), and other metals considered to have possible physiological or

toxicological significance. The ultimate goal of this phase of the program is to provide background data on all elements which may be found in water and which may be of significance in water quality management.

In carrying out the spectrographic examination, the sample is first passed through a membrane filter, .045 micron pore size, to remove all suspended matter. An aliquot of sample is then acidified with redistilled nitric acid and evaporated to a concentration containing 100 mg. of dissolved solids in 5.0 ml. A portion of the prepared sample is placed in a porcelain boat and sparked using a rotating disc, with concentrations of the 19 programed elements measured on the direct reader (*12*).

Waters of low dissolved solids content can be concentrated to a greater degree than those having a high dissolved solids content, thus accounting for the variable sensitivity shown in the tabulations. Values followed by an asterisk (*) show the limits of sensitivity at which the test was performed and indicate that the ion being measured was not detected at that level.

It is known that trace concentrations of some ions are subject to precipitation and adsorption on container surfaces during storage. This applies particularly to iron and manganese which are subject to oxidation. Hence, all the values reported by the spectrographic method represent the quantity of metal in solution at the time of analysis to within about 10 percent.

The measurement of sodium and potassium is performed using a flame procedure. Fluoride is determined with the SPADNS reagent using the method described by Bellack and Schouboe (*3*). Boron, previously measured by the curcumin procedure, is now reported from the spectrograph. Measurement of selenium has been eliminated due to the general absence of this element from the samples examined.

The concentrations of surface active agents, reported as alkyl benzene sulfonate (ABS), in the Nation's surface waters is reported for the first time on a number of selected stations. As the capability of determining this pollutant increases, efforts will be made to include all sampling points in the Surveillance System. The data presented here were obtained using a modification of the Standard Methods methylene blue procedure on an automatic analyzer.

The Benthos

Animals and plants that live in or on the bottom substrata of lakes and streams are known as the benthos. This biological community includes such common animals as immature insects, worms, clams, snails, and crustacea. The benthic populations found on a stream bottom are largely determined by the type of substrate. Bottoms consisting of soft silty sediments are normally inhabited by animals that are able to burrow into the sediments and feed on organic detritus in the sediments. These include worms, clams, and certain insect larvae. The number of species is usually small in these habitats. Shallow streams with shoals, rapids, and riffles have more available niches for animals to occupy and the normal benthic fauna usually includes a large variety of organisms.

The benthic populations provide a basic indicator of general water quality. Whereas the plankton organisms move downstream with the current, and fish are able to migrate considerable distances, the benthos is a population relatively fixed on the bottom and the animals are subject to the water flowing over them. The benthic populations will therefore be influenced by the quality of the water.

The animals that make up the benthos have various life cycles. Insects may exist as aquatic larvae living in the bottom for as long as 2 years. They then emerge as adults and mate. The female deposits fertilized eggs into the stream. Some of the class produce young which attach themselves to fish. Some of the worms reproduce asexually. An analysis of the age structure of certain forms in the benthos may provide information on past conditions of the water.

Under conditions of good water quality the benthos should include a variety of species with no one species being present in excessive numbers. If the water should become degraded, certain species in the population, intolerant of the changed environment, will die out; and as the water quality deteriorates, increased numbers of species in the benthos will be eliminated. The one or more species that survive may be able to develop very large populations. Toxic materials in the water or deposited on the bottom may effectively eliminate all bottom life.

At each station where bottom samples are taken an attempt is made to find areas of suitable substrate. From these areas, where pos-

sible, a series of at least six quantitative samples is taken by means of suitable dredges or samplers. In riffles the Surber squarefoot sampler is used. In deep rivers the Ekman or Peterson dredge is used (see Standard Methods, for the Examination of Water and Wastewater, 11th edition, pp. 572–582) (*22*). A general qualitative collection of invertebrate life is usually made at all stations.

The bottom materials are screened in the field using a screen with 28 meshes to the inch. The concentrated sample is preserved in alcohol and returned to the laboratory.

In the laboratory the sample is transferred to pans and the macroscopic organisms are separated from the sediment and detritus. The animals are then identified as near to species as possible, enumerated, and weighed. Specimens are preserved and retained for future reference.

During this year benthos data were gathered for stations in the Ohio and Tennessee River basins only and are presented with the descriptive material for the appropriate stations. A supplemental analysis of these data will be published separately.

Fish Populations

Fish are a biological end product of the aquatic environment. They are an important source of food, and sport fishing is one of our leading forms of recreation. The maintenance of fish life has been recognized by the Congress, and by States which have protective pollution control legislation, as an important and legitimate use of our Nation's waterways. In other words, in measuring fish populations at Surveillance System stations, we are not measuring a parameter that affects a water use as in the case of other measurements presented in this compilation, but rather a unique parameter that is in itself considered a beneficial water use.

The water quality requirements and tolerance of aquatic life to different types of contaminants vary tremendously. It is this variability in response which makes living aquatic organisms usable indicators of environmental disturbance. Fish require water relatively high in dissolved oxygen, and are intolerant of many chemical and physical contaminants resulting from agricultural, industrial and mining practices. However, the tolerance of different species varies, and man-induced changes of the environment often affect one species more than another, producing imbalanced populations which quite often favor the species less desirable economically.

Moderate amounts of putrescible wastes may enrich the habitat, resulting in great increases in standing crops of fish present. However, under such conditions, the more tolerant and adaptable species may comprise a disproportionate share of the total population, and very sensitive species may be eliminated altogether. The effect of toxic wastes may vary from complete elimination of populations to a reduction in reproductive capacity, growth and resistance to disease and parasitism.

Fish kills are a spectacular and obvious indication that an abrupt change has taken place in the environment. However, because of high mobility resulting in rapid recruitment, the fish population in a river or stream may return to normal levels within a very short time after a kill.

Chronic pollution, to which the fish population must adjust over a period of time, will be reflected in the kinds and relative abundance of the fish species present. In addition to the species composition, the condition of the fish, their growth, reproductive success and certainly their palatability are factors of considerable importance in evaluating the suitability of a body of water for supporting usable stocks of fish.

During the current water year, data on fish populations were gathered for some stations in the Ohio and Tennessee River basins only, and are presented in tables in volume 5 for the appropriate stations.

Fish samples at these stations were collected primarily with rotenone and with an electrofishing device. Five percent emulsified rotenone was applied at suitable sites, where an area of 1 to 3 acres could be blocked off with nets during the rotenoning operation. Such sites were usually in the form of small coves along the shoreline, the mouths of small tributaries, or behind the partial enclosure created by navigational lock walls. An electrical shocking device was used along the shoreline both during the day and at night. In a few cases, samples were also collected with trammel nets and with short, 25-foot haul seines. Sampling with nets and seines was limited because of the paucity of habitat in large rivers which is suitable for using these types of gear.

With each method used sufficient sampling was done to collect as many species present as possible, and to obtain a measure of the relative abundance and size distribution of the various species. Every type of fishing gear is somewhat selective, and the data obtained may not be representative of the actual population composition present in the river at the time of sampling. However, the data obtained by a given method are quantitatively comparable and may be used to evaluate changes in the population composition resulting from natural and man-induced changes in the habitat. Comparisons should be based on samples collected with the same gear, during the same season of the year, and under similar conditions of stream flow and water temperature. These data will be particularly useful in determining the impact of changes in water quality on the fish populations of the Nation's rivers over long periods of time.

For convenience of comparison, the fish in the tables are grouped into six major categories based on food habits and methods of feeding:

I. Large, sight feeding carnivores that feed on other fish. This group includes most game species.

II. Species that feed primarily on insects. This group provides important forage for species in group I.

III. Species that feed primarily on plankton and algae. These also provide important forage for group I species.

IV. Species that feed primarily on mollusks.

V. Omnivores that feed indiscriminately on plant and animal matter from the bottom.

VI. Scavengers that take any available food. Some of the species in this group may sometimes act as predators. The group also includes many important food fish, and species that are tolerant of degraded conditions.

Because foods and feeding habits vary with size, age, and availability of food, there may be considerable overlap between groups. The species listed were grouped according to available literature regarding the main foods of adult specimens of each species.

In the field the total length of the fish was routinely measured to the nearest inch class on a one-half inch interval. Thus a fish in the 5-inch class would measure from 4.5 inches to slightly under 5.5 inches. If the end of the tail touched the dividing line between two length classes, the fish was included in the higher classification. The percent total number and weight are carried to the nearest one-tenth of 1 percent in the tables. The one-tenth of 1 percent was arbitrarily selected for purposes of tabulation, and does not imply such a high level of sampling accuracy.

The fish are listed by common names in the tables according to American Fisheries Society Special Publication No. 2 (1960), A List of the Common and Scientific Names of Fishes From the United States and Canada, Second edition (*1*).

Stream Flow

Stream flow data have a most important role in the utilization of water quality parameters such as are included in this report. For this reason, average daily flow records are reported for most of the sampling stations in the System.

All flow data included in this compilation are *provisional* data furnished by the agencies credited, and are subject to revision by such agencies prior to any final publication. With the exceptions mentioned, the flows are given as furnished to the Public Health Service.

The data were generally furnished in units of cubic feet per second. In general only the first three digits were considered significant. Because of machine limitations the data are reported here in thousand cubic feet per second. Even though three zeros may appear after the decimal, no artificial accuracy of measurement is implied. Only the first three digits should be considered significant. There are two exceptions:

(1) When the flow was over 1 million cubic feet per second, the first four digits are reported, and (2) at times when the Rio Grande flows were extremely low, the data were reported to tenths of a cubic foot per second. These figures are published showing 4 decimal places.

Flow data for sampling stations on the rivers of the Great Lakes system are reported as the monthly mean flow, as computed by the U.S. Lake Survey. In certain other rivers, flow data were computed by the Public Health Service from information supplied by the gaging agency. The methods of computations are shown as footnotes to the data for the applicable stations.

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Explanation of Analytical Data

RADIOACTIVITY DETERMINATIONS

In evaluating radioactivity data it should be noted that the reported errors represent counting errors only and the reported values are subject to other errors commonly associated with gross radioactivity analysis. (See Reference 22.)

A dash (—) in the count column signifies that no determination was made. An asterisk (*) following date of sample indicates that determinations are for composites of two or more samples taken on and before the date shown.

Strontium 90 determinations are reported in micro-microcuries per liter as measured from total solids in the sample composited for the quarter. A dash (—) indicates that no determination was made in that period.

PLANKTON POPULATION

Plankton data are reported on two pages. The first page lists the population size of various groups of algae. A coded number shows the ten most abundant genera of algae and their count level. Code numbers used are identified on page 18. Blank spaces on the data sheets signify that counts of other genera were below a level of 150 per ml. The second page of plankton data lists the four dominant diatom species and their occurrence as a percent of the total diatom population. The percent of occurrence of all other diatom species is shown in the next column. Identification codes of species are given on page 19.

The detectable numbers per ml. of fungi, sheathed bacteria and protozoa are shown in the next two columns. The rotifer and crustacea totals per liter are listed together with the genera where these occurred at a count level of five or more per liter for rotifers and three or more per liter for crustacea. Nematode and miscellaneous animal form counts per liter appear in the last two columns.

A dash (—) indicates that no analysis was made. A zero count of each group is indicated by "0". Blank spaces under abundance and dominance columns indicate that the populations were too few to be included or were absent. Coding for abundant genera of rotifer and crustacea population levels are presented on page 20.

PLANKTON POPULATION

Identification Codes of Algae Genera and Count Levels of Most Abundant Genera

KEY TO COUNT LEVEL (per ml.)

1 150 to 300
2 301 to 600
3 601 to 1,200
4 1,201 to 2,400
5 2,401 to 4,800
6 4,801 to 9,600
7 9,601 to 19,200
8 19,201 to 38,400
9 38,401 and over

Code to ALGAE GENERA (Producers)

Blue-green Algae

01 Agmenellum (Merismopedia)
02 Anacystis (Microcystis)
03 Anacystis
04 Coccochloris
05 Gomphosphaeria
06, 07, 08 Reserve
09 Other genus
10 Other genus

Filamentous blue-greens

11 Anabaena
12 Aphanizomenon
13 Arthrospira
14 Lyngbya
15 Oscillatoria
16 Phormidium
17 Raphidiopsis
18 Spirulina
19, 20, 21 Reserve
22 Other genus
23 Other genus

Coccoid green algae

24 Actinastrum
25 Ankistrodesmus
26 Chlorella-type
27 Chlorococcum
28 Closterium
29 Coelastrum
30 Crucigenia
31 Dictyosphaerium
32 Golenkinia
33 Lagerheimia
34 Micractinium
35 Oocystis
36 Palmellococcus
37 Pediastrum
38 Scenedesmus
39 Staurastrum
40 Tetradesmus
41 Tetrastrum
42, 43 Reserve
44 Other genus
45 Other genus

Filamentous green algae

46 Cladophora
47 Stichococcus
48 Stigeoclonium
49 Reserve
50 Other genus

Green flagellates

51 Chlamydomonas including Carteria
52 Euglena
53 Lepocinclis
54 Pandorina
55 Phacotus
56 Phacus
57 Trachelomonas
58 Reserve
59 Other genus

Other pigmented flagellates

60 Chromulina
61 Dinobryon
62 Gymnodinium
63 Peridinium
64 Reserve
65 Other genus

Diatoms (with chromatophores)

Centric

66 Biddulphia
67 Coscinodiscus
68 Cyclotella
69 Melosira
70 Rhizosolenia
71 Stephanodiscus
72 Other genus

Pennate

73 Achnanthes
74 Amphiprora
75 Amphora
76 Anomoeoneis
77 Asterionella
78 Caloneis
79 Cocconeis
80 Cymatopleura
81 Cymbella
82 Diatoma
83 Diploneis
84 Fragilaria
85 Gomphonema
86 Gyrosigma
87 Navicula
88 Nitzschia
89 Pleurosigma
90 Rhoicosphenia
91 Surirella
92 Synedra
93 Tabellaria
94, 95, 96 Reserve
97 Other genus
98 Other genus
99 Other genus

PLANKTON POPULATION

Identification Code for Diatom Species

No.	Species	No.	Species	No.	Species
01	Achnanthes lanceolata	35	Diatoma elongatum	69	Nitzschia denticula
02	Achnanthes minutissima	36	Diatoma vulgare	70	Nitzschia (Lancelolatae group)
03	Achnanthes sp.	37	Diatoma sp.	71	Nitzschia sp. (first)
04	Amphiprora paludosa	38	Diploneis smithii	72	Nitzschia sp. (second)
05	Amphiprora sp.	39	Diploneis sp.	73	Opephora martyi
06	Amphora ovalis	40	Epithemia turgida	74	Pinnularia sp.
07	Amphora sp.	41	Epithemia sorex	75	Pleurosigma delicatulum
08	Anomoeoneis exilis	42	Epithemia sp.	76	Rhoicosphenia curvata
09	Asterionella formosa	43	Eunotia sp. (first)	77	Rhizosolenia eriensis
10	Bacillaria paradoxa	44	Eunotia sp. (second)	78	Rhopalodia gibba
11	Biddulphia laevis	45	Fragilaria capucina	79	Rhopalodia sp.
12	Caloneis amphisbaena	46	Fragilaria construens	80	Stephanodiscus astraea var. minutula
13	Caloneis sp.	47	Fragilaria crotonensis	81	Stephanodiscus dubius
14	Ceratoneis arcus	48	Fragilaria pinnata	82	Stephanodiscus hantzschii
15	Cocconeis pediculus	49	Fragilaria sp.	83	Stephanodiscus niagarae
16	Cocconeis placentula	50	Frustulia sp.	84	Stephanodiscus sp.
17	Cocconeis sp.	51	Gomphonema olivaceum	85	Surirella brightwelli
18	Coscinodiscus rothii	52	Gomphonema sp.	86	Surirella ovata
19	Coscinodiscus (brackish)	53	Gyrosigma kutzingii	87	Surirella striatula
20	Coscinodiscus sp.	54	Gyrosigma sp.	88	Surirella sp.
21	Cymatopleura solea	55	Hantzchia amphioxys	89	Synedra acus
22	Cymatosira belgica	56	Melosira ambigua	90	Synedra pulchella
23	Cyclotella atomus	57	Melosira distans var. alpigena	91	Synedra nana
24	Cyclotella comta	58	Melosira granulata	92	Synedra ulna
25	Cyclotella kutzingiana	59	Melosira binderana	93	Synedra vaucheriae
26	Cyclotella meneghiniana	60	Melosira islandica	94	Synedra sp.
27	Cyclotella pseudostelligera	61	Melosira italica	95	Tabellaria fenestrata
28	Cyclotella stelligera	62	Melosira varians	96	Tabellaria flocculosa
29	Cyclotella striata	63	Meridion circulare	97	Any entity not found above (first)
30	Cyclotella sp.	64	Navicula cryptocephala	98	Any entity not found above (second)
31	Cymbella ventricosa	65	Navicula sp. (first)	99	Reserved for future entity
32	Cymbella tumida	66	Navicula sp. (second)	xx	Insignificant or population inadequate
33	Cymbella sp.	67	Nitzschia acicularis		
34	Denticula sp.	68	Nitzschia tryblionella		

PLANKTON POPULATION

Identification Codes of Microinvertebrate Genera and Count Levels of Most Abundant Genera

Genera of ROTIFERS
Key to counts per liter

1 5 to 10
2 11 to 20
3 21 to 40
4 41 to 80
5 81 to 160
6 161 to 320
7 321 to 640
8 641 to 1,680
9 1,681 and over

Genera of CRUSTACEA
Key to counts per liter

1 3 to 5
2 6 to 10
3 11 to 20
4 21 to 40
5 41 and over

Code to
MICROINVERTEBRATES

Rotifers

01 Asplanchna
02 Brachionus (also Platyias)
03 Collotheca
04 Cephalodella
05 Chromogaster
06 Euchlanis
07 Filinia
08 Gastropus
09 Hexarthra (also Pedalia)
10 Kellicottia
11 Keratella
12 Lepadella
13 Monostyla (also Lecane)
14 Notholca
15 Philodina and similar contracted bdelloids
16 Ploesoma
17 Polyarthra
18 Pompholyx
19 Proales
20 Rotaria
21 Synchaeta
22 Trichocerca
23 to 45 Reserve
46 Other genus
47 Other genus
48 Other genus
49 Other genus

Cladocerans

50 Nauplii
51 Bosmina and related genera
52 Daphnia and related genera
53 Moina
54 Polyphemus
55 to 72 Reserve
73 Other genus
74 Other genus
75 Other genus

Copepods

76 Cyclops,Euclops, and Paracyclops
77 Diaptomus
78 to 97 Reserve
98 Other genus
99 Other genus

Blank—Insignificant or population inadequate

ORGANIC CHEMICALS

Although units of concentration may be assigned to the values reported herein (µg/l or parts per billion), it is essential that the user of these data consider additional associated information. Introspective examination of the data reported herein has indicated that comparison of concentration values obtained from samples of similar gallonage are more valid than samples of widely differing gallonage. In addition, recent experimental researches have shown that lower flow rates and lower sample volumes than those employed (5,000 gallons at 0.5 gpm) are substantially more efficient and should produce relatively higher concentration values with this method. The first in a series of changes designed to increase sampling efficiency is already underway at Water Pollution Surveillance System stations.

Concentration values reported for specific substances are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE. In light of an unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.

Zeros when reported have been entered. A dash indicates that the respective results were not reported. An asterisk in the column showing end of sample date indicates that the determinations are for composited samples taken on and before the date shown. The extent of compositing can be determined by examining the gallons filtered, which is the sum of the applicable individual samples immediately above it.

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

The data entered in each column are as reported. Concentrations of alkalinity and hardness are reported in milligrams per liter as $CaCO_3$. A dash signifies that the particular test was not performed. Zeroes when meaningful have been entered. An asterisk preceding a number should be read as "less than" the number following it.

TRACE ELEMENTS AND OTHER DETERMINATIONS

For a discussion of the sensitivity limits of the determinations performed with spectrographic methods, see page 11.

BASIN 9

MISSOURI RIVER

The Missouri River is formed by the junction of the Gallatin, Madison, and Jefferson Rivers in southwestern Montana at the town of Three Forks and flows 2,464 miles to its confluence with the Mississippi River at St. Louis. The drainage area is 529,000 square miles. Ten States and a portion of Canada are included in this basin.

Average annual precipitation varies from 10 inches in Wyoming and Montana, to 40 inches per year at St. Louis. Average air temperatures in the northern and southern parts of the basin vary from 60° to 80° F. in July and 5° to 30° F. in January.

The river is regulated by multipurpose dams and reservoirs on major tributaries and the main stem. Major Missouri River impoundments include Fort Peck, Garrison, Oahe and Ft. Randall, and Gavin's Point. The principal tributaries to the main stem are the Yellowstone, Big Sioux, Platte, and Kansas Rivers. The Big Horn River is a tributary to the Yellowstone.

Yellowstone River: The headwaters of the Yellowstone River are in the Absaroka Mountains in northwestern Wyoming. The river flows through Yellowstone National Park into Montana and then northeasterly to its confluence with the Missouri River just beyond the North Dakota State line.

Big Horn River: The Big Horn River is formed at Riverton in west central Wyoming by the junction of Buffalo Creek and the Wind River. It flows north between the Absaroka and Big Horn Mountains and enters Montana where it joins the Yellowstone River near Custer.

Big Sioux River: The Big Sioux River flows almost due south from its headwaters in northeastern South Dakota to its confluence with the Missouri River at Sioux City, Iowa. Its overall length is 420 miles.

Platte River: The Platte River is formed by the junction of the North Platte and South Platte Rivers at North Platte, Nebr. This river then flows across the middle of Nebraska to join the Missouri River below Omaha, Nebr. The principal use of the Platte River is for irrigation.

South Platte River: The South Platte River originates in South Park in central Colorado, flows east from the mountains a few miles south of Denver, and then flows northerly to Denver. Denver obtains a por-

Preceding page blank

tion of its water supply from, and discharges all of its wastes into, this river. After leaving Denver the South Platte flows north and east to North Platte, Nebr., where it joins the North Platte River. The South Platte is heavily utilized to supply an extensive irrigation system largely devoted to sugar beet production.

North Platte River: The North Platte River flows from northern Colorado into Wyoming where it makes a wide arc to the east and enters Nebraska. This stream has a large number of reservoirs for irrigation and storage, and sustains an important fish and wildlife activity. Sugar beets are an important crop in this area.

Kansas River: The Kansas River is formed by the confluence of the Smoky Hill and Republican Rivers in central Kansas. The river then flows almost due east to its confluence with the Missouri River at Kansas City.

Phytoplankton populations at stations in the basin are generally less than 5,000 milliliter. However, a few stations have very high algae counts. These stations are: on the Missouri River at Yankton, S. Dak.; Kansas River at DeSoto, Kans.; Platte River at Plattsmouth, Nebr.; and the Big Sioux River at Sioux Falls, S. Dak. These stations have relatively high concentrations of dissolved phosphate, and support a rich, diverse algal flora, which in addition to large populations of centric diatoms, consists of a variety of coccoid and flagellated green algae including *Scenedesmus, Ankistrodesmus, Actinastrum, Oocystis,* and *Chlamydomonas.*

The phytoplankton of the lower Missouri (below Bismarck) is dominated by the centric diatoms *Stephanodiscus hantzschii* and *S. astraea* var. *minutula.* The phytoplankton of the upper Missouri, its tributaries, and the upper tributaries of the Platte are dominated by pennate diatoms, including *Asterionella formosa, Diatoma vulgare, Fragilaria* spp. and *Navicula* spp.

Zooplankton counts are low at all stations except Yankton where the rotifers *Polyarthra, Synchaeta,* and *Trichocerca,* together exceed 600/liter during late summer.

A report on a study of PHS Water Pollution Surveillance System data from the main stem of the Missouri River is being published separately. This study was based essentially upon data from water years 1958 through 1962, together with a limited amount of more recent information. It was concluded that present waters of the Missouri River are, with treatment, suitable for municipal and industrial uses. Recreational values are severely limited in the lower reach because of bacteriological pollution from municipal and industrial wastes. Those trends that were found were generally toward poorer water quality; scheduled construction of waste treatment facilities should provide for reversals of some of these trends.

The report includes a brief discussion of identifications of pesticide in Missouri River waters. Examinations of the aromatic fractions of six carbon chloroform extracts from St. Louis verified the presence of dieldrin during October 13-27, 1958; August 15-30, September 15-30, October 15-31, November 15-20, and December 16-31, 1963 in apparent concentrations of from 0.002 to 0.004 ug/l. DDT, DDD, DDE, and endrin were absent from these samples. As noted on page 21, these concentrations are minimal. Chromatographic analysis of grab samples of Missouri River water showed the following concentrations of dieldrin: Williston, 1 20 64—0.016 ug/l, 2 3 64—0.025 ug/l; Bismarck, 1 20 64—0.040 ug/l, 2 3 64—0.025 ug/l; St. Joseph, 1 20 64—0.023 ug/l, 2 3 64—0.020 ug/l, 2 17 64—0.020 ug/l; Kansas City, 1 20 64—0.040 ug/l, 2 3 64—0.051 ug/l, 2 17 64—0.029 ug/l. Again, DDT, DDD, DDE, and endrin were absent. These data suggest that concentrations based on carbon filter samples are low by perhaps an order of magnitude.

Finding pesticide in the October 1958 sample is particularly significant. This demonstrates that, as new analytical techniques are being developed and become routine surveillance tools, the stored extracts provide a source of historical data that are otherwise not available.

The report also notes, in summarizing levels of radioactivity, the strong dependence of alpha activity upon suspended solids and thus upon regional geological conditions. It has been found that the range of natural alpha activity is from 0 to 30 pico-curies per gram of suspended solids. Occasional increased levels of alpha activity are reported in this volume for a number of individual samples; these are associated with higher suspended solids concentrations.

BIG HORN RIVER AT HARDIN, MONTANA

The Public Health Service Water Pollution Surveillance System station at Hardin is located 60 miles below the Wyoming-Montana State line. Samples are taken at the municipal water treatment plant intake.

736-498 O - 64 - 3

Station Location: Big Horn River at Hardin, Montana

Major Basin: Missouri River

Minor Basin: Yellowstone River

Station at: 45°44' Latitude 107°35' Longitude

Miles above mouth: 40

Activation Date: December 18, 1961

Sampled by: Hardin Water Department

Field Analysis by: Hardin Water Department
U. S. Public Health Service

Other Cooperating Agencies: Montana Department of Health

Hydrologic Data:

Nearest pertinent gaging station: Near St. Xavier, Montana

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 19,620 square miles

Period of record: 1934 to present

Average discharge in record period: 3,438 cfs.

Maximum discharge in record period: 37,400 cfs.

Minimum discharge in record period: 228 cfs.

Remarks: Gage located upstream from diversion dam of Bighorn Canal. Discharges include diversions through canal. Upstream irrigation diversions for total of about 375,000 acres.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.55	.55
	Na	93	82
	K	2.2	5.2
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	7	9
	Cd	*7	*6
	As	*72	*60
	B	79	84
	P	*36	*30
	Fe	18	30
	Mo	47	*15
	Mn	1.4	*6
	Al	–	12
	Be	*.18	*.02
	Cu	4	*6
	Ag	*1.4	*1.5
	Ni	*4	*6
	Co	*14	*6
	Pb	*36	*15
	Cr	*4	*15
	V	*7	*30
	Ba	47	30
	Sr	415	360

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	1.3	.3	April to June	5.8	.6
January to March	–	–	July to September	–	–

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE MONTANA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN YELLOWSTONE RIVER

STATION LOCATION BIG HORN RIVER AT HARDIN, MONTANA

104

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON					
			DATE OF DETERMINATION		ALPHA					BETA					DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO.	DAY	YR.	MO.	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
10	1	62	10	26	8	4	8	5	16	6	20	18	14	18	42	25						
10	8	62	11	28	2	3	1	4	3	5	32	16	17	17	49	23						
10	15	62	11	15	-	-	-	-	-	-	37	16	29	10	66	19						
10	22	62	11	16	2	2	9	5	11	5	14	14	19	17	33	22						
10	29	62	12	19	2	2	14	6	16	6	21	15	30	18	51	23						
11	5	62	11	27	0	1	8	5	8	5	4	13	22	19	26	23						
11	13	62	12	4	0	1	4	4	4	4	19	13	39	19	58	25						
11	19	62	12	4	2	1	8	5	10	5	19	13	42	19	61	22						
11	26	62	12	18	4	3	6	4	10	5	21	25	24	26	45	36						
12	3	62	1	2	3	3	8	5	11	6	36	12	24	13	60	18						
12	10	62	1	9	2	2	6	5	8	5	20	9	32	20	52	22						
12	17	62	1	11	5	2	10	5	15	5	22	13	35	16	57	21						
12	24	62	1	10	0	1	5	5	5	5	2	26	53	33	55	42						
12	31	62	1	15	2	2	8	5	10	5	27	16	44	20	71	26						
1	28	63	2	20*	1	2	7	6	8	6	1	14	12	21	13	25						
2	25	63	3	22*	7	6	6	5	13	8	90	21	64	18	154	23						
3	26	63	4	22*	6	5	2	4	8	6	40	16	34	15	74	22						
4	29	63	5	31*	31	27	4	4	35	27	362	54	43	11	405	65						
5	27	63	6	21*	56	30	8	4	64	30	396	77	53	13	449	78						
6	24	63	8	6*	40	33	3	3	43	33	454	114	50	17	504	115						
7	29	63	9	9*	16	8	9	5	25	9	84	11	36	9	120	14						
3	26	63	10	4*	2	3	7	5	9	6	72	29	38	28	110	40						
9	30	63	11	6*	61	35	9	6	70	36	405	169	51	32	456	172						

PLANKTON POPULATION

STATE MONTANA
MAJOR BASIN MISSOURI RIVER
MINOR BASIN YELLOWSTONE RIVER
STATION LOCATION BIG HORN RIVER AT
HARDIN, MONTANA

104

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	MICROINVERTEBRATES																				
			1ST		2ND		3RD		4TH		OTHER SPECIES PERCENT		PROTOZOA (Identifiable) Number per ml.	ROTIFERS											CRUSTACEA							NEMATODES (Identifiable) Number per liter	OTHER ANIMAL FORMS (Number per liter)
														NUM PER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD		4TH		5TH		NUM- BER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT					GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	1	62	65	31	36	18	92	9	15	7	35	-	-	-											-							-	-
10	15	62	65	32	36	13	15	6	92	4	40	-	-	0											0							0	0
11	5	62	65	57	36	13	16	5	64	4	21	-	-	0											0							0	0
11	19	62	65	32	36	30	15	9	66	4	25	50	-	0											0							0	0
12	3	62	36	64	65	8	92	4	15	3	21	2360	-	0											0							0	0
12	17	62	36	38	65	19	16	10	15	3	30	-	-	0											0							0	0
1	7	63	65	26	36	21	92	6	53	5	40	-	-	0											0							0	0
1	21	63										-	-	0											0							0	0
2	4	63										-	-	0											0							0	0
2	18	63	65	24	36	16	92	15	71	5	40	-	-	0											0							0	0
3	4	63										-	-	-											-							-	-
3	18	63	65	26	36	22	36	11	92	10	31	-	-	-											-							-	-
4	1	63	36	36	65	16	66	12	15	9	27	-	-	-											-							-	-
4	15	63	65	24	36	22	72	11	56	10	33	-	-	1											0							0	0
5	6	63	70	82	26	8	92	2	36	2	6	-	-	-											-							-	-
5	20	63										-	-	-											-							-	-
6	3	63										-	-	-											-							-	-
6	17	63										-	-	-											-							-	-
8	5	63										-	-	-											-							-	-
8	19	63										-	-	-											-							-	-
9	3	63										-	-	-											-							-	-
9	16	63										-	-	-											-							-	-

PLANKTON POPULATION

STATE MONTANA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN YELLOWSTONE RIVER

STATION LOCATION BIG HORN RIVER AT HARDIN, MONTANA

104

DATE OF SAMPLE			ALGAE (Number per milliliter)										INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS					1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	7900	80	0	100	*	100	0	700	5590	40	540	87	4	50	4	82	3	79	3	71	3	92	2	88	1	81	1				
10	15	62	4500	0	0	0	0	40	0	310	4160	40	170	87	4	82	3	81	2	88	1	79	1	92	1								
11	5	62	700	0	0	110	0	0	0	0	630	20	1100	87	2																		
11	19	62	1000	0	0	50	0	0	0	20	970	0	810	87	2	82	1																
12	3	62	4600	0	0	0	0	40	0	120	4430	80	80	82	5	87	2	92	1	79	1												
12	17	62	1900	0	0	40	0	0	0	90	1770	20	800	82	3	87	2	79	1														
1	7	63	400	0	0	0	0	0	0	40	330	20	370																				
1	21	63	00	0	0	0	0	0	0	0	20	0	0																				
2	4	63	100	0	0	20	0	0	0	0	80	0	50																				
2	18	63	00	0	0	20	0	0	0	20	20	0	200																				
3	4	63	900	0	0	0	0	20	0	90	750	0	810																				
3	18	63	200	0	0	0	0	20	0	70	130	0	620																				
4	1	63	900	0	0	20	0	0	0	180	660	20	970	82	2	87	1																
4	15	63	1600	0	0	80	0	110	20	60	1320	20	1450	77	2	87	2	82	1														
5	6	63	400	0	0	0	0	0	0	20	420	20	400	88	1																		
5	20	63	1400	0	20	150	0	0	0	150	1080	20	880	77	3	38	1																
6	3	63	300	0	0	0	0	0	0	90	200	0	240																				
6	17	63	*	-	-	-	-	-	-	-	-	-	-																				
8	5	63	9700	70	0	2020	0	120	0	3000	4500	540	1720	25	2	38	2	35	2	29	2	84	2										
8	19	63	100	0	0	0	0	0	0	0	150	20	60																				
9	3	63	*	-	-	-	-	-	-	-	-	-	-																				
9	16	63	*	-	-	-	-	-	-	-	-	-	-																				

* TOO TURBID TO COUNT

10 1 62 * 1370

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE MONTANA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN YELLOWSTONE RIVER

STATION LOCATION BIG HORN RIVER AT HARDIN, MONTANA

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	13.0	8.8	8.6	-	-	-	-	-	6	160	308	5	260	325	.0	685	-
10	8	62	12.5	9.7	8.5	-	-	-	-	-	-	180	328	-	170	-	-	-	-
10	15	62	12.0	8.6	8.6	-	-	-	-	.3	-	-	310	-	150	-	-	-	-
10	22	62	11.0	10.5	8.6	-	-	-	-	.1	-	160	330	-	150	-	-	-	-
10	29	62	12.0	11.0	8.6	-	-	-	-	.2	-	181	352	-	180	-	-	-	-
11	5	62	9.0	9.9	8.6	-	-	-	-	.2	-	168	320	-	75	-	-	-	-
11	13	62	6.5	11.5	8.6	-	-	-	-	.3	-	180	360	-	50	-	-	-	-
11	19	62	3.5	12.5	8.6	-	-	-	-	.1	-	170	340	-	75	-	-	-	-
11	26	62	5.5	12.4	8.0	-	-	-	-	.3	13	168	384	0	135	390	.0	735	-
12	3	62	4.0	12.0	8.6	-	-	-	-	.2	-	180	360	-	150	-	-	-	-
12	8	62	-	-	8.2	-	-	-	-	-	23	162	360	0	*25	375	.0	781	-
12	10	62	3.0	12.5	7.3	-	-	-	-	.3	12	180	380	5	*25	312	.0	711	-
12	17	62	4.5	12.0	8.2	-	-	-	-	.3	14	182	352	0	*25	330	.0	750	-
12	24	62	.5	14.0	8.0	-	-	-	-	.3	30	194	348	-	*25	363	.0	658	-
12	31	62	1.5	13.5	8.0	-	-	-	-	.3	12	188	370	-	*25	325	.0	700	-
1	7	63	2.5	13.0	8.1	-	-	-	-	.3	50	176	316	-	*25	225	.0	770	-
1	14	63	1.5	13.5	7.3	-	-	-	-	.2	20	252	468	-	*25	462	.0	950	-
1	21	63	2.0	12.0	7.9	-	-	-	-	.3	14	188	344	-	*25	350	.5	745	-
1	28	63	1.5	-	8.1	-	-	-	-	.3	18	200	360	-	*25	325	.0	740	-
2	4	63	3.0	11.5	8.2	-	-	-	-	.3	6	120	290	-	150	290	.2	610	-
2	11	63	2.5	12.0	7.9	-	-	-	-	.5	11	144	276	15	*25	325	.0	625	-
2	18	63	2.5	11.5	7.9	-	-	-	-	.3	15	184	348	5	*25	362	.0	770	-
2	25	63	2.0	10.0	8.1	-	-	-	-	.2	18	188	364	5	700	387	.0	810	-
3	4	63	3.5	12.5	7.6	-	-	-	-	.3	21	210	450	5	450	440	.0	940	-
3	11	63	5.0	12.5	7.0	-	-	-	-	.3	12	200	370	5	210	380	.0	800	-
3	18	63	6.5	12.5	7.5	-	-	-	-	.3	16	200	370	5	180	350	.0	820	-
3	26	63	11.0	11.3	8.6	-	-	-	-	.4	16	220	300	10	550	380	.0	830	-
4	1	63	11.0	11.0	8.6	-	-	-	-	.4	19	188	370	5	220	360	.2	780	-
4	8	63	11.0	11.0	8.6	-	-	-	-	.4	16	240	420	5	200	380	.0	810	-
4	15	63	13.5	10.1	8.4	-	-	-	-	.3	16	184	340	0	120	410	.0	830	-
4	22	63	9.5	10.7	8.6	-	-	-	-	.3	9	180	380	5	330	380	.0	790	-
5	20	63	12.5	10.0	8.5	-	-	-	-	.2	12	176	320	10	250	300	.1	640	-
5	27	63	16.5	8.5	9.4	-	-	-	-	.3	9	152	300	15	1500	280	.0	580	-
6	3	63	16.0	8.0	9.4	-	-	-	-	.2	6	116	200	5	*25	165	.0	370	-
6	10	63	15.5	9.5	9.4	-	-	-	-	.3	14	184	320	25	500	280	.0	610	-
6	17	63	20.0	9.2	8.6	-	-	-	-	.2	14	122	110	5	2000	240	.0	560	-
6	24	63	18.0	9.1	8.4	-	-	-	-	.2	7	122	200	5	*25	160	.0	390	-
7	1	63	20.5	9.2	8.6	-	-	-	-	.3	8	120	210	0	450	150	.0	400	-
7	8	63	24.5	9.8	8.4	-	-	-	-	.3	-	-	-	-	-	-	-	-	-

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE MONTANA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN YELLOWSTONE RIVER

STATION LOCATION BIG HORN RIVER AT HARDIN, MONTANA

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DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
7	22	63	27.0	10.0	8.6	-	-	-	-	.3	13	158	320	5	77	340	.0	670	-
7	15	63	22.5	9.5	8.6	-	-	-	-	.2	9	130	210	5	280	220	.0	460	-
7	29	63	23.5	10.0	8.4	-	-	-	-	.2	22	190	450	15	800	500	.0	940	-
8	5	63	24.0	10.7	8.6	-	-	-	-	.2	16	140	350	5	*25	380	.0	730	-
8	12	63	26.5	13.5	9.6	-	-	-	-	.2	20	160	370	5	98	450	.0	928	-
8	19	63	27.5	7.5	8.6	-	-	-	-	.3	19	190	460	10	1000	540	.0	1050	-
8	26	63	24.0	10.0	8.6	-	-	-	-	.3	-	-	-	-	-	-	-	-	-
9	3	63	24.0	7.5	8.4	-	-	-	-	.3	13	170	410	10	2000	440	.0	900	-
9	9	63	22.5	7.5	8.6	-	-	-	-	.2	18	184	390	5	275	450	.0	850	-
9	16	63	19.5	8.5	8.4	-	-	-	-	.2	17	192	540	10	1500	650	.0	1160	-
9	23	63	18.0	8.0	8.4	-	-	-	-	.3	16	164	370	10	*25	480	.0	880	-
9	30	63	10.0	9.1	8.4	-	-	-	-	.2	15	184	360	5	*25	380	.0	750	-

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station near St. Xavier, Montana
Operated by U.S. Geological Survey

STATE: Montana

MAJOR BASIN: Missouri River

MINOR BASIN: Yellowstone River

STATION LOCATION: Big Horn River at Hardin, Montana

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	3.460	3.040	2.700	2.960	2.200	2.450	1.770	3.460	6.890	13.500	2.150	2.210
2	3.460	3.040	2.700	2.920	2.150	2.310	1.400	2.950	7.070	12.400	2.150	2.260
3	3.810	3.000	2.730	2.960	2.300	2.170	1.320	2.700	9.320	12.200	2.100	2.660
4	3.520	3.040	2.700	3.040	2.500	2.100	1.530	2.540	11.400	11.700	2.150	2.620
5	3.360	3.040	2.420	3.360	3.000	2.040	1.920	2.490	11.300	9.710	2.160	2.470
6	3.360	3.080	2.590	3.040	4.200	2.010	2.070	2.490	10.600	8.690	2.200	2.370
7	3.420	2.880	2.620	2.760	4.500	2.100	2.100	2.590	8.560	7.760	2.150	2.350
8	3.530	2.960	2.660	2.700	4.100	2.480	2.070	2.720	7.780	7.100	2.010	2.300
9	2.960	2.960	2.700	2.000	3.600	2.240	1.920	2.880	6.770	7.390	1.810	2.320
10	2.800	2.360	2.700	1.200	3.280	2.070	1.800	2.990	6.180	8.630	2.010	3.470
11	3.330	3.040	2.560	.700	2.730	2.200	1.920	2.900	5.660	7.660	2.160	3.200
12	3.350	2.960	2.100	.500	2.480	2.340	1.740	2.990	5.460	7.020	2.060	2.720
13	3.170	2.960	2.450	.600	2.420	2.280	1.560	3.490	5.980	6.520	1.810	2.480
14	3.170	3.000	2.450	.800	2.340	2.200	1.530	3.340	5.830	5.970	1.760	2.420
15	2.980	3.040	2.760	1.200	2.380	2.200	1.500	2.930	6.170	5.570	2.460	2.460
16	3.120	3.080	2.840	1.600	2.380	2.240	1.370	2.710	10.900	5.380	2.200	2.470
17	3.320	2.800	2.840	1.800	2.420	2.280	1.380	2.620	20.300	4.790	2.100	2.540
18	3.400	2.730	2.880	1.800	2.420	2.200	1.690	2.520	21.800	4.010	2.050	2.460
19	3.400	2.660	2.880	1.600	2.420	2.200	1.790	2.440	19.100	3.520	2.050	2.480
20	3.400	2.730	2.840	1.700	2.420	2.280	1.760	2.480	19.500	3.310	2.100	2.530
21	3.400	2.840	2.840	1.800	2.480	2.340	1.690	2.370	20.500	3.070	2.050	2.450
22	3.320	3.000	2.840	1.750	2.380	2.340	1.760	2.360	21.000	2.890	1.900	3.420
23	3.280	2.700	2.620	1.650	2.520	2.420	1.830	2.220	21.600	2.740	1.950	4.610
24	3.040	2.730	2.000	1.750	2.590	2.480	1.890	2.590	19.800	2.690	2.000	3.630
25	3.000	2.730	1.400	1.650	2.620	2.520	1.710	3.200	17.900	2.370	2.000	3.310
26	3.000	3.040	1.200	1.650	2.620	2.450	1.460	5.270	17.500	1.800	2.100	3.310
27	2.960	3.000	1.600	1.700	2.560	2.420	1.590	6.580	15.800	1.650	2.100	3.190
28	3.120	2.880	2.000	1.600	2.560	2.340	7.200	5.480	12.700	1.900	2.050	3.150
29	3.120	3.000	2.500	1.650		2.240	6.730	5.180	14.400	2.050	2.050	3.190
30	3.120	2.760	3.120	1.750		2.240	4.890	5.550	14.900	2.100	2.050	3.130
31	3.040		3.080	1.950		2.170		6.110		2.050	2.100	

BIG SIOUX RIVER BELOW SIOUX FALLS, SOUTH DAKOTA

Samples are collected from the first county road bridge east of U.S. Highway 229 and south of Sioux Falls. No municipal supplies are taken from the Big Sioux River. The city of Sioux Falls discharges secondary sewage treatment plant effluent with a BOD population equivalent of 13,500 to the stream. The "Pathfinder" atomic power plant which went into operation in June 1962 discharges industrial wastes to this river.

Algae reached a peak in population in early December in the Big Sioux River at Sioux Falls. Total algae increased to 167,000 per milliliter on December 5, 1962. Successive samples on December 19 and January 9, were down sharply to the 15,000 to 20,000 level. Most of the diatoms in these samples were centric diatoms.

The seasonal median coliform levels obtained through water year 1963 are tabulated below. Since April 1962, when the treatment plant went into operation, there has been a marked reduction although even the low values are relatively high.

	Median Coliform Levels/100 ml.		
Water Year	1961	1962	1963
Autumn	–	12,000,000	720,000
Winter	–	20,000,000	6,000,000
Spring	Station Activated	50,000	190,000
Summer	4,500,000	300,000	360,000

Concurrent average reductions of 80 to 90% in BOD, 60 to 70% in COD, and 70 to 90% in phosphate were observed.

Station Location: Big Sioux River below Sioux Falls, South Dakota

Major Basin: Missouri River

Minor Basin: Big Sioux River

Station at: 43°33' Latitude 96°42' Longitude

Miles above mouth: 158

Activation Date: May 19, 1961

Sampled by: Sioux Falls Sewage Treatment Plant

Field Analysis by: Sioux Falls Sewage Treatment Plant

Other Cooperating Agencies: South Dakota State Department of Health

Hydrologic Data:

Nearest pertinent gaging station: Near Brandon, South Dakota

Gaging station operated by: U.S. Geological Survey

Drainage area at guging station: 5,810 square miles including 1,970 probably non-contributing

Period of record: 1959 to present

Average discharge in record period: 812 cfs.

Maximum discharge in record period: 17,100 cfs.

Minimum discharge in record period: 8 cfs. (daily)

Remarks: Flow affected by power plant operations.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
2-27-63	0.56
3-6-63	0.84
3-13-63	0.48
3-20-63	0.25
4-3-63	0.12
4-10-63	0.21
4-17-63	0.17
5-1-63	0.09
5-15-63	0.11
5-22-63	0.17
5-29-63	0.09
6-5-63	0.12
6-12-63	0.11
6-19-63	0.09
7-10-63	0.13
7-17-63	0.16
7-24-63	0.16
7-31-63	0.06
8-7-63	0.08
8-14-63	0.07
8-21-63	0.12
8-28-63	0.10
9-4-63	0.15
9-25-63	0.09
9-30-63	0.13

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.25	.50
	Na	68	39
	K	3.9	9.4
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	21	10
	Cd	*7	*7
	As	*71	*66
	B	103	76
	P	497	66
	Fe	18	13
	Mo	*14	*20
	Mn	*1.4	*3.3
	Al	–	*33
	Be	*.18	*.17
	Cu	*4	*5.3
	Ag	*1.4	*1.7
	Ni	*4	*7
	Co	*14	*7
	Pb	*36	*33
	Cr	*4	*17
	V	*7	*33
	Ba	89	43
	Sr	200	165

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	2.5	.3	April to June	–	–
January to March	–	–	July to September	9.5	.6

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE SOUTH DAKOTA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN BIG SIOUX RIVER

STATION LOCATION BIG SIOUX RIVER BELOW SIOUX FALLS, SOUTH DAKOTA 80

DATE SAMPLE TAKEN			DATE OF DETERMINATION		RADIOACTIVITY IN WATER												DATE OF DETERMINATION		RADIOACTIVITY IN PLANKTON			
					ALPHA						BETA								GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO.	DAY	YR	MO.	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
10	5	62	10	25	-	-	-	-	-	-	3	10	22	17	25	20						
10	10	62	11	2	-	-	-	-	-	-	6	12	28	17	34	21						
10	17	62	11	8	0	1	3	3	3	3	18	12	37	18	55	22						
10	23	62	11	17	-	-	-	-	-	-	8	11	18	18	26	21						
10	31	62	11	23	-	-	-	-	-	-	44	11	31	15	75	19						
11	28	62	12	31*	-	-	-	-	-	-	11	10	42	15	53	18						
12	19	62	1	21*	2	2	8	5	10	5	17	12	38	16	55	20						
1	30	63	2	20*	0	2	5	7	5	7	19	32	21	46	40	56						
2	27	63	3	18*	0	1	2	3	2	3	9	6	40	9	49	11						
3	27	63	4	17*	1	1	3	4	4	4	76	14	130	20	206	24						
4	24	63	5	24*	2	1	5	3	7	3	39	13	87	19	126	23						
5	29	63	6	21*	2	2	3	3	5	4	67	10	115	14	182	17						
6	26	63	7	30*	1	2	4	4	5	4	48	15	70	18	118	23						
7	31	63	8	23*	2	2	6	4	8	4	139	18	97	18	236	25						
8	28	63	10	1*	3	2	0	1	3	2	30	8	75	10	105	13						
9	24	63	11	6*	1	1	0	1	1	1	34	13	24	12	58	18						

PLANKTON POPULATION

STATE SOUTH DAKOTA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN BIG SIOUX RIVER

STATION LOCATION BIG SIOUX RIVER BELOW SIOUX FALLS, SOUTH DAKOTA 080

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml)	MICROINVERTEBRATES																					
			1ST		2ND		3RD		4TH				PROTOZOA (Identifiable) (Number per ml)	ROTIFERS										CRUSTACEA								NEMATODES (Identifiable) (Number per liter)	OTHER ANIMAL FORMS (Number per liter)
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)										NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)									
															1ST		2ND		3RD		4TH		5TH				1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL			GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	3	62	27	37	26	26	82	16	23	10	11	-	-	5										3	50	1					0	0
10	17	62	82	51	26	32	58	4	23	4	9	-	-	6										0							0	0
11	7	62	82	82	26	16	70	1	86	1		-	-	5										0							0	0
11	21	62	82	93	26	4	80	1	36	1	1	-	-	11	20	1								0							0	0
12	5	62	82	84	71	5	72	3	26	2	6	80	-	2										0							0	0
12	19	62	82	91	70	2	26	1	51	1	5	-	-	0										0							1	0
1	9	63	82	33	9	23	80	16	83	8	20	-	-	0										0							1	0
1	30	63	82	76	70	5	71	5	67	3	11	-	-	0										0							3	0
2	20	63										-	-	0										0							0	0
3	6	63	82	60	26	7	23	5	70	5	23	-	-	0										0							400	0
3	20	63	27	57	26	13	82	13	70	4	13	-	-	0										0							0	0
4	3	63	71	36	92	10	58	7	26	6	41	-	-	0										2							0	0
4	17	63	20	28	82	19	71	13	21	8	32	-	-	0										0							0	0
5	8	63	82	56	92	11	83	7	26	6	20	-	-	-										-							-	-
5	22	63	82	46	83	16	26	15	58	3	20	-	-	-										-							-	-
6	5	63	83	53	26	21	82	10	58	4	12	-	-	-										-							-	-
6	19	63	82	48	83	23	26	18	80	3	8	-	-	-										-							-	-
8	7	63										-	-	-										-							-	-
8	21	63										-	-	-										-							-	-
9	4	63										-	-	-										-							-	-

PLANKTON POPULATION

STATE SOUTH DAKOTA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN BIG SIOUX RIVER

STATION LOCATION BIG SIOUX RIVER BELOW SIOUX FALLS, SOUTH DAKOTA 80

DATE OF SAMPLE			ALGAE (Number per milliliter)								INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS			1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	3	62	114300	3020	500	31540	0	1370	210	73860	3770	16730	370	68	9	24	7	71	7	38	7	88	5	25	4	3	4	51	3	33	3	44	3
10	17	62	44900	1130	2840	20050	0	500	0	18770	1620	9090	590	71	7	38	6	68	6	24	6	17	5	44	4	27	4	69	4	26	4	3	3
11	7	62	50400	540	360	4280	0	230	680	42980	1350	6080	1350	71	8	68	6	38	4	24	3	44	3	62	3	3	2	17	1	26	1	31	1
11	21	62	67900	230	1130	1890	0	810	2160	58950	2750	6530	1350	71	9	57	4	68	4	69	4	17	3	38	3	51	2	26	2	52	2	40	2
12	5	62	166900	290	7540	33250	0	11470	120	112610	1680	9730	2280	38	7	17	6	52	6	51	6	25	6	33	5	24	4	44	3	30	3	40	3
12	19	62	15600	220	310	1430	0	270	490	12160	670	220	90	71	1	38	3	65	2	17	2	68	1	51	1	44	1	26	1				
1	9	63	21600	0	0	180	0	720	0	20390	360	500	320	71	7	65	3	68	2	88	1												
1	30	63	700	0	150	110	0	70	20	240	110	40	0	71	1																		
2	20	63	1200	0	270	100	0	60	40	700	40	210	20	17	1																		
3	6	63	1800	20	0	20	0	70	330	1250	70	130	20	71	3	60	2	68	1														
3	20	63	13700	40	670	530	0	190	2730	7180	2370	1760	630	68	6	63	5	88	4	71	3	17	2	91	2	87	2	38	1				
4	3	63	21800	80	420	4420	0	1810	1130	10790	3150	6680	1260	68	6	71	6	38	4	88	4	64	3	51	3	26	3	25	2	17	2	92	2
4	17	63	46000	290	4070	12770	0	1220	4700	13690	9240	10370	840	71	7	38	6	63	5	88	5	26	5	17	5	80	4	24	4	68	4	51	4
5	8	63	56400	0	6930	31670	0	1050	2230	9160	5330	7560	2020	38	7	24	7	26	6	25	6	17	6	71	6	92	5	88	4	68	3	51	3
5	22	63	186200	240	3360	114920	0	130	1550	60980	4910	7730	1340	38	9	71	9	68	7	26	6	24	5	45	5	17	5	88	5	63	4	30	4
6	5	63	61900	1010	1300	36470	0	2480	130	15540	5000	5710	2020	38	7	71	7	24	6	25	5	68	5	26	5	44	5	88	4	51	4	91	4
6	19	63	23700	140	50	8230	0	1560	20	11370	2350	2080	720	71	6	38	6	68	4	51	4	24	3	25	2	79	2	69	2	25	2	35	2
8	7	63	9700	220	120	3470	100	120	50	4130	1500	7040	1060	24	3	25	3	38	3	3	1	35	1	45	1								
8	21	63	31000	170	290	1370	0	80	0	27700	1410	5710	290	69	7	24	2	14	1	44	1												
9	4	63	36600	540	0	5750	0	200	0	28340	1830	18340	620	38	5	44	3	69	3	41	2	2	2	25	2	24	2	37	1	45	1		

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE SOUTH DAKOTA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN BIG SIOUX RIVER

STATION LOCATION BIG SIOUX RIVER BELOW SIOUX FALLS, SOUTH DAKOTA 80

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	3	62	14.0	7.1	8.1	10.4	67	-	-	.2	52	240	388	15	110	200	.5	638	1500M
10	10	62	16.0	6.9	8.2	14.4	70	-	-	1.2	41	240	386	15	90	202	.7	665	640M
10	17	62	12.1	7.1	8.6	10.4	93	-	-	.6	46	261	440	15	110	212	2.9	932	870M
10	24	62	8.0	7.9	8.1	14.4	85	-	-	1.0	178	272	458	10	110	217	1.2	840	800M
10	31	62	7.6	9.0	8.1	24.0	64	-	-	.2	62	267	400	20	125	244	2.0	699	100M
11	7	62	5.6	8.2	8.1	21.2	91	-	-	.1	135	261	410	10	180	223	.2	706	9000M
11	14	62	5.6	9.0	8.2	10.0	91	-	-	.2	68	249	422	10	150	220	2.1	723	260M
11	21	62	6.0	9.0	8.2	10.4	67	-	-	.6	76	255	406	10	160	205	1.9	714	75M
11	28	62	7.8	9.0	8.1	9.6	72	-	-	.6	98	270	420	10	195	223	2.2	785	390M
12	5	62	3.6	10.1	8.1	14.8	93	-	-	.2	87	266	402	10	200	210	2.0	679	2000M
12	12	62	.0	10.9	8.1	22.8	105	-	-	.4	130	328	504	10	150	144	3.7	860	6000M
12	19	62	3.9	9.7	8.1	28.0	75	-	-	.2	105	314	494	10	250	274	3.9	905	500M
1	2	63	2.0	9.9	7.9	12.0	60	-	-	7.0	91	482	530	10	300	281	2.4	894	-
1	8	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1000M
1	9	63	4.5	8.2	7.9	27.2	93	-	-	.8	164	356	566	10	0	278	2.1	990	-
1	16	63	.0	8.2	7.7	28.4	224	-	-	17.2	340	382	558	20	150	322	6.0	1320	-
1	30	63	1.5	3.5	7.6	32.0	160	-	-	4.6	76	352	486	20	150	304	4.7	1380	11000M
2	6	63	3.0	6.1	7.6	52.0	155	-	-	.4	245	286	458	30	150	292	3.2	1056	8800M
2	13	63	3.0	5.2	7.7	16.4	121	-	-	.8	228	344	504	20	*25	284	4.2	1098	-
2	19	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3600M
2	20	63	2.0	6.0	7.4	10.0	96	-	-	8.8	242	300	474	10	*25	255	8.6	1038	-
2	27	63	4.0	5.7	7.7	24.0	128	-	-	1.4	187	332	478	10	-	310	11.0	1080	-
3	6	63	4.2	6.6	7.6	18.4	118	-	-	11.4	176	296	454	10	30	204	6.5	1086	15000M
3	13	63	2.0	8.7	7.6	20.0	81	-	-	9.0	187	260	406	10	*25	226	5.6	856	-
3	20	63	1.5	12.0	7.7	28.0	100	-	-	.2	40	156	286	20	25	146	.8	427	-
3	27	63	2.4	11.0	7.7	22.4	90	-	-	.4	25	122	206	90	210	113	2.2	345	500M
4	3	63	9.2	8.6	8.0	10.4	69	-	-	.4	23	176	320	20	120	172	1.0	490	*120M
4	10	63	3.5	9.0	8.6	21.6	89	-	-	2.2	25	132	444	10	95	247	.4	664	*120M
4	17	63	12.2	8.6	8.4	11.5	75	-	-	2.0	27	206	386	10	55	227	.3	609	-
4	24	63	7.8	10.2	8.5	9.6	82	-	-	3.0	20	222	394	10	95	219	2.0	667	1000M
5	1	63	10.0	10.1	8.5	9.6	70	-	-	3.0	20	209	410	10	200	233	.8	733	-
5	8	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*25M
5	22	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10000M
5	29	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	220M
6	5	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2400M
6	12	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	400M
6	19	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	140M
6	26	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	120M

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE SOUTH DAKOTA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN BIG SIOUX RIVER

STATION LOCATION BIG SIOUX RIVER BELOW SIOUX FALLS, SOUTH DAKOTA 80

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
7	3	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	550M
7	10	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	125M
7	17	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	550M
7	24	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	330M
7	31	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	85M
8	14	63	19.8	7.3	8.2	7.5	23	–	–	2.2	28	258	355	10	120	136	.5	576	360M
8	21	63	20.7	6.0	8.3	12.5	64	–	–	.8	38	251	390	10	120	148	.5	546	190M
8	28	63	22.5	3.1	8.2	17.5	67	–	–	3.2	45	252	392	10	75	177	1.1	575	500M
9	4	63	20.0	5.1	8.2	16.3	72	–	–	2.0	52	238	404	10	65	176	1.6	542	–
9	11	63	21.9	4.2	7.7	8.5	67	–	–	3.2	65	237	390	10	62	166	1.4	577	2000M
9	25	63	15.5	8.2	8.1	6.0	53	–	–	.6	30	169	310	10	170	–	.7	416	–

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station near Brandon, South Dakota
Operated by U.S. Geological Survey

STATE: South Dakota

MAJOR BASIN: Missouri River

MINOR BASIN: Big Sioux River

STATION LOCATION: Big Sioux River below Sioux Falls, South Dakota

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	.188	.128	.114	.060	.030	.040	.462	.336	.210	.128	1.370	.162
2	.185	.124	.096	.066	.044	.046	.399	.324	.199	.120	1.390	.169
3	.182	.120	.096	.074	.038	.047	.381	.345	.199	.120	1.490	.157
4	.169	.118	.100	.084	.032	.046	.339	.348	.205	.096	1.590	.167
5	.169	.116	.098	.072	.050	.047	.336	.330	.219	.116	1.590	.143
6	.167	.122	.069	.060	.060	.050	.345	.303	.240	.114	1.600	.143
7	.174	.116	.085	.046	.050	.052	.345	.285	.252	.114	1.490	.141
8	.172	.114	.069	.050	.040	.055	.336	.264	.279	.128	1.260	.134
9	.172	.113	.084	.051	.038	.052	.321	.255	.297	.159	.998	.132
10	.169	.111	.069	.042	.036	.051	.306	.240	.303	.199	.794	.130
11	.159	.107	.065	.040	.028	.058	.294	.231	.324	.210	.650	.122
12	.157	.107	.055	.044	.026	.060	.246	.258	.339	.208	.606	.116
13	.162	.105	.040	.038	.030	.055	.273	.264	.330	.237	.535	.100
14	.159	.105	.045	.040	.038	.054	.252	.270	.363	.196	.463	.100
15	.159	.105	.050	.040	.046	.067	.246	.291	.396	.167	.409	.100
16	.147	.103	.055	.042	.048	.085	.237	.306	.384	.111	.351	.102
17	.145	.102	.060	.042	.038	.088	.231	.330	.345	.182	.267	.105
18	.143	.095	.063	.040	.038	.126	.219	.351	.312	.157	.274	.102
19	.141	.098	.058	.038	.040	.255	.225	.369	.285	.111	.261	.146
20	.134	.098	.056	.026	.040	.267	.210	.360	.261	.10[illegible]	.237	.210
21	.136	.090	.056	.048	.054	.243	.202	.318	.243	.118	.219	.305
22	.132	.088	.056	.040	.044	.309	.213	.297	.222	.162	.205	.385
23	.128	.090	.063	.030	.047	.351	.216	.285	.205	.196	.196	.392
24	.128	.091	.056	.040	.044	.519	.205	.273	.196	.225	.205	.392
25	.158	.090	.059	.038	.045	.677	.196	.252	.191	.240	.188	.348
26	.134	.093	.060	.026	.056	.748	.193	.243	.188	.237	.185	.312
27	.130	.095	.069	.026	.055	.840	.180	.237	.216	.351	.185	.321
28	.124	.096	.070	.032	.047	.698	.213	.228	.174	.292	.172	.321
29	.124	.095	.065	.030		.635	.228	.216	.152	.354	.164	.302
30	.102	.086	.060	.028		.688	.294	.210	.132	.765	.159	.289
31	.118		.055	.026		.582		.205		1.190	.162	

KANSAS RIVER AT DeSOTO, KANSAS

Samples are collected at the intake of the Sunflower Ordnance Works, Hercules Powder Company. Twenty miles upstream, Lawrence, Kansas discharges primary treatment plant effluent with a BOD population equivalent of 20,000. Topeka, Kansas, 52 miles upstream, discharges secondary effluent with about 16,000 BOD population equivalent. Lawrence uses the river for a portion of its municipal supply.

Agriculture is the principal economic activity with diversified crops being grown. Industrial wastes have an important effect upon the lower reach of the river. There are numerous irrigation diversions above this station.

736-498 O - 64 - 4

Station Location:	Kansas River at DeSoto, Kansas
Major Basin:	Missouri River
Minor Basin:	Kansas River
Station at:	39°00' Latitude 95°00' Longitude
Miles above mouth:	33
Activation Date:	April 29, 1963
Sampled by:	Hercules Powder Company (Sunflower Ordnance Works)
Field Analysis by:	Hercules Powder Company U.S. Public Health Service
Other Cooperating Agencies:	Kansas State Board of Health
Hydrologic Data:	
Nearest pertinent gaging station:	At Bonner Springs, Kansas
Gaging station operated by:	U.S. Geological Survey
Drainage area at gaging station:	59,890 square miles
Period of record:	1917 to present
Average discharge in record period:	6,739 cfs.
Maximum discharge in record period:	510,000 cfs.
Minimum discharge in record period:	160 cfs.
Remarks:	Flows influenced by operations of reservoirs in Colorado, Nebraska, and Kansas and by upstream irrigation diversions.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	–	.40
	Na	–	80
	K	–	9.0
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	–	8
	Cd	–	*4
	As	–	*40
	B	–	56
	P	–	*20
	Fe	–	16
	Mo	–	10
	Mn	–	*4
	Al	–	48
	Be	–	*.1
	Cu	–	10
	Ag	–	1.2
	Ni	–	10
	Co	–	*4
	Pb	–	*10
	Cr	–	*10
	V	–	*20
	Ba	–	34
	Sr	–	380

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	–	–	April to June	4.9	.5
January to March	–	–	July to September	7.4	.6

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE KANSAS

MAJOR BASIN MISSOURI RIVER

MINOR BASIN KANSAS RIVER

STATION LOCATION KANSAS RIVER AT DE SOTO, KANSAS

128

DATE SAMPLE TAKEN			DATE OF DETERMINATION		RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON					
					ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO.	DAY	YR.	MO	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
4	30	63	5	17	0	2	3	4	3	4	31	22	85	29	116	36						
5	7	63	5	27	0	7	1	2	1	7	195	35	100	8	295	36						
5	14	63	6	12	1	1	0	2	1	2	40	6	77	9	117	11						
5	21	63	6	5	2	4	4	3	6	5	227	39	85	17	312	43						
5	28	63	6	12	13	14	0	2	13	14	556	92	127	18	683	94						
6	4	63	6	17	3	2	3	3	6	4	35	7	71	8	106	11						
6	11	63	7	1	1	1	5	4	6	4	16	6	76	9	92	11						
6	18	63	7	10	5	3	1	1	6	3	56	11	68	10	124	15						
6	25	63	7	10	5	4	5	3	10	5	102	19	79	17	181	25						
7	2	63	7	17	25	19	0	2	25	19	485	94	78	16	563	95						
7	9	63	7	31	6	4	2	2	8	4	91	22	70	10	161	24						
7	16	63	8	7	64	44	2	2	66	44	598	198	49	10	647	188						
7	22	63	8	12	10	6	3	2	13	6	100	19	49	8	149	21						
7	30	63	8	12	4	2	4	3	8	4	33	8	61	9	94	11						
8	6	63	8	21	1	1	2	3	3	3	16	8	60	29	76	30						
8	13	63	8	27	0	1	2	3	2	3	38	14	58	17	96	22						
8	20	63	9	16	4	3	0	1	4	3	80	9	62	8	142	12						
8	27	63	9	16	6	4	2	2	8	4	46	9	46	8	92	12						
9	3	63	9	23	9	5	13	7	22	9	122	10	128	11	250	15						
9	10	63	10	2	4	3	5	3	9	4	46	16	55	16	101	23						
9	17	63	10	4	11	9	3	3	14	9	105	41	52	16	157	44						
9	24	63	10	8	3	3	0	1	3	4	38	16	54	17	92	23						

PLANKTON POPULATION

STATE KANSAS

MAJOR BASIN MISSOURI RIVER

MINOR BASIN KANSAS RIVER

STATION LOCATION KANSAS RIVER AT DE SOTO, KANSAS

128

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	MICROINVERTEBRATES																							
			1ST		2ND		3RD		4TH				ROTIFERS														CRUSTACEA										
															GENERA AND COUNT LEVEL (See text for Codes)												GENERA AND COUNT LEVEL (See text for Codes)									
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT		PROTOZOA (Identifiable) Number per ml.	NUMBER PER LITER	1ST		2ND		3RD		4TH		5TH		NUMBER PER LITER	1ST		2ND		3RD		NEMATODES (Identifiable) Number per liter	OTHER ANIMAL FORMS (Number per liter)
															GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
5	7	63																																		
5	20	63	80	80	56	4	9	3	14	2	11																									
6	18	63																																		
8	6	63																																		
8	20	63																																		
9	2	63																																		
9	24	63																																		

PLANKTON POPULATION

STATE KANSAS
MAJOR BASIN MISSOURI RIVER
MINOR BASIN KANSAS RIVER
STATION LOCATION KANSAS RIVER AT DE SOTO, KANSAS

DATE OF SAMPLE			ALGAE (Number per milliliter)										INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS					1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
5	7	63	900	0	0	150	0	40	0	400	330	350	900																			
5	20	63	1500	0	0	40	0	0	0	1170	240	130	330	71	3																	
6	18	63	800	0	0	40	0	0	0	550	220	290	1190																			
8	6	63	25200	0	0	4460	0	260	0	12230	8210	10540	3170	38	4	35	3	31	2	25	2	69	2	24	1	32	1	45	1				
8	20	63	16300	20	70	3290	0	240	40	9290	3380	6770	3380	38	3	24	3	25	2	37	1	35	1	44	1								
9	2	63	60500	20	0	5680	0	1520	20	49210	4000	4660	900	38	5	57	3	52	2	35	2	24	2	25	2	51	2	30	1	69	1	44	1
9	24	63	1900	0	0	230	0	430	0	480	750	70	200	51	1	52	1																

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE KANSAS
MAJOR BASIN MISSOURI RIVER
MINOR BASIN KANSAS RIVER
STATION LOCATION KANSAS RIVER AT DE SOTO, KANSAS

128

DATE OF SAMPLE					GALLONS FILTERED	EXTRACTABLES			CHLOROFORM EXTRACTABLES									
BEGINNING			END								NEUTRALS							
MONTH	DAY	YEAR	MONTH	DAY		TOTAL	CHLORO-FORM	ALCOHOL	ETHER INSOLUBLES	WATER SOLUBLES	TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
9	10	63	9	27	5030	85	26	59	0	4	15	4	2	9	0	3	1	1	2

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE KANSAS
MAJOR BASIN MISSOURI RIVER
MINOR BASIN KANSAS RIVER
STATION LOCATION KANSAS RIVER AT DE SOTO, KANSAS

128

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
4	30	63	-	-	-	-	-	-	-	-	122	220	340	5	*25	150	.2	650	-
5	7	63	-	-	-	-	-	-	-	-	70	172	250	15	500	85	.1	400	-
5	21	63	-	-	7.4	-	-	-	-	-	66	210	260	15	390	98	.1	510	-
5	28	63	-	-	8.1	-	-	-	-	-	70	174	290	20	*25	85	.1	470	-
6	4	63	-	-	7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	11	63	27.0	-	8.7	-	-	-	-	-	120	190	290	5	*25	122	.3	570	-
6	18	63	25.0	-	8.1	-	-	-	-	-	76	136	210	15	1500	50	.1	370	-
6	25	63	27.0	-	-	-	-	-	-	-	100	220	300	20	350	122	.9	590	-
7	2	63	31.0	-	8.1	-	-	-	-	-	80	180	230	10	1000	78	.2	430	-
7	9	63	27.0	-	8.1	-	-	-	-	-	60	190	250	10	330	70	.0	390	-
7	16	63	28.0	-	-	-	-	-	-	-	55	128	150	15	3000	60	.2	270	-
7	22	63	29.5	-	8.1	-	-	-	-	-	50	126	210	5	420	55	.2	350	-
7	30	63	26.0	-	8.2	-	-	-	-	-	90	164	240	5	190	110	.5	490	-
8	6	63	27.5	-	8.1	-	-	-	-	-	175	196	330	10	*25	172	.6	770	-
8	13	63	26.0	-	8.1	-	-	-	-	-	100	180	240	10	110	100	.6	470	-
8	20	63	22.0	-	8.1	-	-	-	-	-	100	140	200	10	210	80	.3	420	-
8	27	63	25.0	-	8.1	-	-	-	-	-	165	144	200	5	350	72	.4	360	-
9	3	63	25.0	-	8.5	-	-	-	-	-	90	170	260	5	200	100	.5	460	-
9	10	63	26.0	-	8.1	-	-	-	-	-	120	160	260	5	160	104	.4	540	-
9	17	63	22.0	-	8.1	-	-	-	-	-	65	172	250	10	550	84	.2	430	-
9	24	63	19.0	-	8.1	-	-	-	-	-	85	144	250	5	230	116	.4	470	-

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Bonner Springs, Kansas
Operated by U.S. Geological Survey

STATE Kansas

MAJOR BASIN Missouri River

MINOR BASIN Kansas River

STATION LOCATION Kansas River at De Soto, Kansas

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	7.420	5.050	2.760	2.500	1.900	2.740	3.300	2.520	5.000	2.560	1.940	2.500
2	6.350	5.020	2.760	2.500	2.200	2.420	3.420	2.540	4.750	7.740	1.870	2.100
3	5.400	4.700	2.720	2.600	2.500	3.040	3.500	4.280	3.820	10.300	1.670	1.990
4	5.580	3.720	2.640	2.600	3.000	4.750	3.480	5.750	2.880	10.300	1.720	1.960
5	5.400	3.750	2.560	2.600	3.600	10.500	3.300	6.380	2.760	10.700	2.030	1.940
6	8.210	3.400	2.600	2.500	3.500	12.000	3.230	6.700	2.820	10.000	2.170	1.870
7	17.100	3.420	2.520	2.500	3.800	7.760	3.300	5.420	3.230	10.000	2.030	1.720
8	15.500	3.380	2.500	2.500	4.400	6.150	3.820	4.000	3.120	9.170	1.760	1.620
9	8.840	3.350	2.440	2.400	4.700	5.500	3.980	2.930	2.820	7.430	1.720	1.560
10	6.650	3.230	2.460	2.400	4.500	5.320	3.880	3.040	2.600	5.980	1.520	1.890
11	5.400	3.210	2.400	1.900	4.200	5.000	3.880	2.970	2.240	4.550	1.500	3.080
12	4.650	3.190	1.600	1.200	3.100	5.300	3.800	2.720	2.050	3.800	1.520	3.380
13	4.150	3.120	1.800	1.500	2.000	5.850	3.580	2.660	2.080	3.520	1.400	3.280
14	4.000	3.100	2.000	1.800	2.800	6.750	3.150	2.680	1.920	5.380	1.420	2.990
15	3.820	2.990	2.100	1.900	3.200	6.300	3.010	2.990	1.820	5.800	1.490	2.720
16	3.700	3.170	2.200	1.900	3.800	5.350	2.780	4.350	2.580	9.680	1.550	2.680
17	3.700	3.170	2.300	1.800	4.700	5.220	2.760	8.960	5.600	8.000	1.560	3.480
18	3.660	3.400	2.400	1.700	4.400	5.050	2.820	7.250	8.090	6.150	2.150	4.550
19	3.520	3.320	2.400	1.600	4.000	4.600	2.760	5.020	5.850	5.300	2.760	4.400
20	3.660	3.260	2.300	1.400	4.000	4.980	2.660	4.220	4.480	5.500	2.860	3.940
21	3.080	3.350	2.200	1.300	3.500	5.350	2.620	6.400	3.950	4.580	3.300	3.550
22	3.400	3.280	2.100	1.300	3.300	4.820	2.580	9.560	3.3[illegible]	4.050	4.420	2.500
23	3.350	3.230	2.100	1.200	3.000	4.800	2.480	7.850	3.7[illegible]	4.020	4.020	2.520
24	3.320	3.150	2.100	1.200	2.800	5.100	2.440	5.150	3.800	3.750	3.700	2.480
25	3.190	2.720	2.100	1.200	2.800	5.080	2.280	3.280	4.020	3.190	3.040	2.640
26	4.320	2.660	1.900	1.100	2.800	4.980	2.280	7.570	4.450	2.840	2.660	2.930
27	5.450	2.740	1.500	1.100	2.800	4.750	2.320	9.470	4.020	2.480	2.680	2.660
28	5.400	2.840	1.700	1.100	2.800	4.550	2.390	6.890	2.860	2.260	2.800	4.150
29	5.420	2.930	2.000	1.200		4.320	2.420	5.620	2.410	2.140	2.900	5.320
30	5.380	2.860	2.200	1.300		4.250	2.500	4.650	2.550	1.990	3.060	6.380
31	5.300		2.400	1.300		4.100		5.220		1.920	2.600	

MISSOURI RIVER AT ST. LOUIS, MISSOURI

This is the terminal surveillance station on the Missouri River. Samples for organic analyses and bacteriological examinations are obtained from the intake of St. Louis County Water Company treatment plant at river mile 36.6. All other analyses are made on water collected from the intake of the city of St. Louis' Howard Bend water treatment plant at mile 37.2.

The nearest upstream municipal and industrial waste discharges which affect this station are those from the metropolitan Kansas City area.

Station Location: Missouri River at St. Louis, Missouri

Major Basin: Missouri River

Minor Basin: Lower Missouri below Niobrara River

Station at: 38°41' Latitude 90°32' Long[illegible]de

Miles above mouth: 37

Activation Date: October 1957

Sampled by: St. Louis County Water Company
St. Louis Water Department

Field Analysis by: St. Louis County Water Company
St. Louis Water Department

Other Cooperating Agencies: Missouri Department of Public Health
Missouri Water Pollution Board

Hydrologic Data:

Nearest pertinent gaging station: At Hermann, Missouri

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 528,200 square miles

Period of record: 1897 to present

Average discharge in record period: 79,570 cfs.

Maximum discharge in record period: 676,000 cfs.

Minimum discharge in record period: 4,200 cfs.

Remarks:

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
3-12-63	0.04
3-25-63	0.04
4-1-63	0.03
4-8-63	0.04
4-15-63	0.06
4-22-63	0.04
5-6-63	0.03
[illegible]-63	0.03
5-20-63	0.02
5-27-63	0.04
6-3-63	0.04
6-10-63	0.02
6-24-63	0.03
7-1-63	0.03
7-8-63	0.03
7-15-63	0.02
7-22-63	0.04
7-29-63	0.04
8-5-63	0.05
8-26-63	0.06
9-3-63	0.06
9-9-63	0.06
9-23-63	0.07
9-30-63	0.06

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.50	.60
	Na	48	42
	K	6.8	5.6
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	18	12
	Cd	*5	*4
	As	*45	*40
	B	81	82
	P	23	109
	Fe	23	39
	Mo	38	8
	Mn	1.6	6
	Al	–	86
	Be	*.11	*.1
	Cu	*2	6
	Ag	*.9	*1
	Ni	*2	*4
	Co	*9	*4
	Pb	23	*10
	Cr	*2	*10
	V	*5	*20
	Ba	151	94
	Sr	252	203

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	2.7	.3	April to June	–	–
January to March	–	–	July to September	6.2	.6

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l
8/15 - 8/30/63	Dieldrin	.004
9/15 - 9/30/63	Dieldrin	.003

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE MISSOURI

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT ST. LOUIS, MISSOURI 28

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON					
			DATE OF DETERMINATION	ALPHA					BETA						DATE OF DETERMINATION	GROSS ACTIVITY				
				SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL		ALPHA		BETA		
MO	DAY	YR	MO DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO. DAY	pc/g	±	pc/g	±
10	1	62	11 2	–	–	–	–	–	–	138	86	36	10	174	87					
10	29	62	11 21	14	8	5	3	19	8	31	23	30	16	61	28					
11	29	62	12 21*	6	5	3	3	9	6	24	33	36	15	60	36					
12	24	62	1 21*	1	2	2	2	3	3	13	8	31	9	44	12					
1	28	63	2 16*	4	5	7	4	11	6	26	19	40	18	66	26					
2	25	63	3 11*	3	2	3	3	6	3	15	12	37	14	52	18					
3	25	63	4 15*	20	13	6	2	26	13	221	43	49	5	280	43					
4	22	63	5 17*	14	9	2	2	16	9	89	44	32	13	131	46					
5	27	63	6 13*	35	23	2	2	37	23	524	103	66	16	590	104					
6	24	63	7 23*	13	15	4	3	17	15	248	68	56	13	304	69					
7	29	63	8 16*	21	16	2	3	23	16	219	49	53	16	272	52					
8	26	63	9 20*	9	7	3	3	12	8	83	33	29	13	112	35					
9	30	63	10 17*	2	5	0	3	2	6	14	34	35	16	49	38					

PLANKTON POPULATION

STATE MISSOURI

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT

ST. LOUIS, MISSOURI 028

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	MICROINVERTEBRATES																				
			1ST		2ND		3RD		4TH				PROTOZOA (Identifiable) Number per ml.	ROTIFERS											CRUSTACEA							NEMATODES (Identifiable) Number per liter	OTHER ANIMAL FORMS (Number per liter)
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD		4TH		5TH		NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	1	62	80	20	82	9	26	8	58	8	55	-	-	-											-							-	-
10	15	62	58	49	80	13	26	6	82	5	27	-	-	0											0							0	0
11	5	62	80	35	82	19	46	7	83	5	34	-	-	0											0							0	0
11	19	62	80	44	46	15	97	11	48	4	26	-	-	0											0							0	0
12	3	62	82	41	80	19	26	7	46	6	27	-	-	0											0							0	0
12	17	62	82	24	80	23	26	6	46	4	43	-	-	0											0							0	0
1	7	63	82	59	70	7	26	6	71	5	23	-	-	0											0							0	0
1	21	63	82	76	71	4	9	3	72	3	14	-	-	0											0							0	0
2	4	63	82	84	56	7	70	2	68	2	5	-	-	0											0							0	0
2	18	63	9	26	82	26	71	6	64	5	37	-	-	0											0							0	0
3	4	63	71	44	92	10	80	9	36	8	29	-	-	0											0							0	0
3	18	63										-	-	-											-							-	-
4	1	63	71	20	80	10	92	8	56	6	56	-	-	0											0							0	0
4	15	63	82	55	27	18	80	11	26	3	13	-	-	0											0							0	0
5	6	63										-	-	-											-							-	-
5	20	63										-	-	-											-							-	-
6	3	63	82	34	9	31	26	10	80	7	18	-	-	0											0							0	0
6	17	63										-	-	-											-							-	-
7	1	63										-	-	-											-							-	-
7	15	63										-	-	-											-							-	-
8	5	63	58	37	80	23	26	17	56	4	19	-	-	-											-							-	-
8	19	63										-	-	-											-							-	-
9	3	63										-	-	-											-							-	-
9	16	63										-	-	-											-							-	-

PLANKTON POPULATION

STATE MISSOURI

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT ST. LOUIS, MISSOURI 28

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	700	0	0	90	0	90	0	320	180	50	180																		
10	15	62	2300	0	40	480	0	0	0	790	1040	120	210	71	2	88	2	38	1												
11	5	62	4400	0	0	870	0	170	0	2280	1120	790	170	71	4	69	2	88	2	38	2	25	1	24	1	84	1	87	1		
11	19	62	1900	0	70	230	0	110	90	1150	290	560	560	69	2																
12	3	62	3700	0	60	410	0	190	60	1800	1180	830	170	71	4	87	2	38	1	88	1	68	1								
12	17	62	1600	0	40	150	0	110	0	1060	220	620	260	71	3																
1	7	63	1900	0	20	0	0	90	0	1650	140	90	70	71	4	68	1														
1	21	63	1100	0	110	60	0	80	0	780	20	170	20	71	3																
2	4	63	1000	0	0	0	0	150	0	840	20	0	20	71	3																
2	18	63	700	0	0	20	0	40	40	150	400	20	130	77	1																
3	4	63	1600	0	80	20	0	210	190	500	610	340	780	77	2	71	2	65	1												
3	18	63	700	0	0	0	0	60	0	60	530	110	210																		
4	1	63	1100	0	0	0	0	130	170	270	570	210	840	71	1	65	1														
4	15	63	9400	60	130	590	0	570	2000	4640	1410	3530	1370	71	5	65	4	68	3	87	3	51	2	77	2	88	2	38	2	62	1
5	6	63	700	0	0	0	0	40	0	570	70	20	240																		
5	20	63	*	-	-	-	-	-	-	-	-	-	-																		
6	3	63	1800	0	0	480	0	20	0	770	510	550	640	71	3	38	2	77	2	68	1										
6	17	63	*	-	-	-	-	-	-	-	-	-	-																		
7	1	63	*	-	-	-	-	-	-	-	-	-	-																		
7	15	63	1100	0	0	150	0	70	0	830	60	460	190																		
8	5	63	1300	40	20	250	0	100	0	680	170	520	230	69	1	68	1	71	1												
8	19	63	500	0	0	100	0	20	0	270	80	80	190																		
9	3	63	4000	90	0	1740	0	150	0	990	1010	1630	820	38	3	69	1	25	1												
9	16	63	3700	0	0	1090	0	340	0	1760	520	810	450	38	2	69	1	35	1	51	1										

* TOO TURBID TO COUNT

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE MISSOURI

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT ST. LOUIS, MISSOURI

28

DATE OF SAMPLE BEGINNING			DATE OF SAMPLE END		GALLONS FILTERED	EXTRACTABLES			CHLOROFORM EXTRACTABLES									
											NEUTRALS							
MONTH	DAY	YEAR	MONTH	DAY		TOTAL	CHLORO-FORM	ALCOHOL	ETHER INSOLUBLES	WATER SOLUBLES	TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	15	62	10	29	3570	142	33	109	0	8	13	1	1	10	1	4	1	1	6
11	15	62	11	30	4343	194	89	105	7	29	19	2	1	16	0	10	10	2	12
12	15	62	12	31	4763	215	35	180	-	-	-	-	-	-	-	-	-	-	-
1	15	63	1	31	10125#	88	23	65	1	5	9	1	1	7	0	4	1	1	2
2	15	63	2	28	3210	276	60	216	-	-	-	-	-	-	-	-	-	-	-
3	15	63	3	31	3173	240	43	197	1	10	18	1	2	14	1	5	2	1	6
4	15	63	4	30	3480	118	34	84	-	-	-	-	-	-	-	-	-	-	-
5	15	63	5	31	1808	265	70	195	2	19	27	5	3	18	1	9	5	2	6
6	15	63	6	30	1185#	262	104	158	-	-	-	-	-	-	-	-	-	-	-
7	15	63	7	31	2003#	201	59	142	0	16	18	2	2	13	1	9	5	1	10
8	15	63	8	30	3345	127	40	87	-	-	-	-	-	-	-	-	-	-	-
9	15	63	9	30	4777	87	19	68	0	4	8	1	1	6	0	3	1	0	3

ESTIMATED

CHEMICAL. PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE MISSOURI

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI RIVER & MISSOURI RIVER

STATION LOCATION MISSOURI RIVER AT

ST. LOUIS, MISSOURI 24

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	18.9	8.1	8.2	1.6	33	3.4	9.7	.0	14	177	174	20	1000	78	.4	274	12000
10	8	62	19.4	8.7	8.2	2.8	14	2.6	8.8	.1	15	177	200	24	430	90	.6	380	6500
10	15	62	19.4	7.7	8.2	1.3	10	3.0	10.0	.0	16	144	198	20	490	90	.6	381	6600
10	22	62	19.4	8.5	8.2	1.4	12	2.9	9.0	.1	22	151	212	24	550	114	.8	398	12000
10	29	62	14.4	10.1	8.0	3.3	12	2.7	8.0	.0	25	153	220	24	600	115	.4	431	16000
11	5	62	9.4	10.2	8.2	2.6	-	1.5	6.9	.0	23	161	242	12	193	124	.2	463	3000
11	12	62	12.2	10.4	8.2	1.9	5	2.0	5.0	.0	24	174	260	10	170	162	.1	521	-
11	19	62	10.0	10.6	8.1	2.7	7	1.6	4.8	.2	24	178	267	8	170	165	.1	505	10000
11	26	62	7.8	10.9	8.3	2.3	6	1.8	4.2	.0	24	173	260	12	220	177	.1	503	36000
12	3	62	10.0	10.5	8.3	2.7	5	1.9	3.4	.1	25	176	260	9	128	181	.2	505	21000
12	10	62	4.4	12.2	8.2	3.6	4	1.5	2.6	.0	30	208	292	12	110	111	.2	533	9800
12	17	62	1.7	13.0	8.3	5.6	2	1.8	3.1	.2	33	240	296	12	87	134	.2	512	5200
12	24	62	3.3	13.0	8.2	5.6	17	-	-	.3	30	267	343	6	160	159	.2	601	19000
12	31	62	3.9	13.0	8.4	6.0	3	-	-	.4	37	206	302	10	100	156	.2	499	500
1	7	63	.6	12.1	8.3	4.2	0	3.0	4.6	.4	43	244	309	12	70	177	.2	557	5000
1	14	63	2.2	12.6	8.1	3.8	0	3.0	4.7	.4	38	226	305	8	66	164	.3	523	50
1	21	63	.0	12.8	8.1	3.3	2	2.8	3.9	.3	32	243	313	7	28	140	.1	510	1700
1	28	63	.0	12.8	8.4	3.3	3	2.8	4.0	-	32	254	309	9	8	147	.1	504	100
2	4	63	3.3	10.6	8.3	3.4	2	7.3	8.4	1.0	50	256	332	14	17	180	.1	616	700
2	11	63	.0	12.8	-	3.4	3	4.4	7.9	.8	33	208	304	12	88	180	.2	573	2000
2	18	63	.6	12.0	8.1	-	3	5.2	9.9	.6	35	180	240	20	130	126	.2	440	3300
2	25	63	2.2	11.8	8.1	-	4	4.8	8.8	.5	31	181	240	14	155	126	.2	454	2000
3	4	63	2.2	11.9	8.2	-	-	4.4	8.6	.6	32	194	250	14	145	124	.3	461	1000
3	11	63	6.7	10.1	8.0	-	54	5.9	9.8	.6	11	103	132	28	1725	48	.2	217	50000
3	18	63	8.9	10.0	8.3	-	59	6.7	12.5	.4	15	114	144	24	2050	42	.3	231	15000
3	25	63	10.0	8.7	8.3	-	22	5.0	16.1	.4	15	127	170	24	1750	84	.2	294	13000
4	1	63	15.0	7.7	8.2	2.8	29	3.0	15.7	.2	20	151	203	20	700	100	.1	361	14000
4	8	63	15.6	10.8	8.3	4.0	-	2.4	11.5	.0	19	149	216	14	390	102	.2	387	5000
4	15	63	11.7	11.8	8.3	2.7	8	1.6	6.0	.5	31	167	245	14	230	143	.2	479	40000
4	22	63	18.3	10.6	8.3	2.2	10	1.7	4.9	.1	23	170	256	14	240	162	.4	515	*170
4	29	63	17.8	11.6	8.3	4.0	11	1.7	7.5	.0	19	165	240	12	190	102	.2	521	9500
5	6	63	15.6	6.6	8.3	3.7	10	2.8	10.9	.0	18	128	182	30	2625	117	.2	355	18000
5	13	63	18.3	7.3	8.3	1.6	24	2.8	14.9	.0	20	145	205	24	1325	125	.2	441	-
5	20	63	18.9	5.2	8.8	3.2	23	2.9	14.0	.1	15	118	170	32	3400	132	.2	320	-
5	27	63	16.2	7.7	8.0	2.2	23	3.7	13.0	.1	18	141	196	22	675	138	.2	380	17000
6	3	63	21.1	7.3	8.0	1.5	11	1.8	10.4	.0	15	142	194	16	350	113	.3	476	7500
6	10	63	27.8	6.2	8.0	2.2	85	3.9	11.9	.1	20	154	237	12	875	106	.2	456	25000
6	17	63	24.4	6.6	7.9	1.4	27	4.0	15.2	.1	21	140	211	24	2715	149	.3	430	-
6	18	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22000

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE: MISSOURI
MAJOR BASIN: MISSOURI RIVER
MINOR BASIN: LOWER MISSOURI BELOW NIOBRARA RIVER
STATION LOCATION: MISSOURI RIVER AT ST. LOUIS, MISSOURI

28

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
6	24	63	24.4	7.1	8.1	1.7	23	2.9	10.8	.1	27	146	217	24	775	167	.1	441	13000
7	1	63	27.8	5.1	7.9	2.3	125	–	–	–	23	114	195	20	3500	143	.2	–	33000
7	8	63	27.8	5.9	8.0	.9	44	–	–	–	33	138	200	18	1500	163	.2	–	–
7	15	63	26.1	7.1	8.0	1.9	17	2.0	6.0	.0	23	154	234	14	475	180	.4	481	17000
7	22	63	28.3	6.3	8.4	1.1	18	3.9	10.7	.0	35	147	232	18	800	172	.3	478	11000
7	29	63	28.9	6.7	8.2	1.6	9	2.8	5.4	.0	23	153	243	10	265	193	.3	534	9000
8	5	63	28.9	6.5	8.7	.5	14	2.6	7.8	.0	23	153	238	12	245	194	.3	479	4500
8	12	63	28.3	6.9	8.3	1.5	9	2.0	6.8	.0	23	146	232	8	325	195	.4	479	5000
8	19	63	23.9	7.2	8.2	1.2	39	–	–	–	19	142	226	10	775	187	.4	–	16000
8	26	63	25.6	7.4	8.2	1.1	7	1.7	4.9	.0	20	144	230	14	275	193	.3	473	13000
9	3	63	26.7	7.5	8.2	1.3	15	–	–	–	24	152	232	12	160	210	.3	–	–
9	9	63	26.7	7.3	8.3	.8	33	2.0	7.5	.1	23	141	226	16	250	193	.3	487	15000
9	16	63	23.3	7.8	8.3	1.2	17	2.2	8.0	.0	22	144	224	30	180	197	.3	485	25000
9	23	63	23.3	8.0	8.3	1.4	9	2.3	7.8	.0	20	139	215	10	250	178	.4	456	25000
9	30	63	20.0	7.6	–	.2	8	1.5	6.8	.0	24	143	224	14	175	194	.4	449	13000

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Hermann, Missouri
Operated by U.S. Geological Survey

STATE: Missouri

MAJOR BASIN: Missouri River

MINOR BASIN: Lower Missouri below Niobrara River

STATION LOCATION: Missouri River at St. Louis, Missouri

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	61.800	48.000	37.700	18.900	20.000	24.200	61.800	50.300	91.200	53.400	39.900	37.700
2	66.200	48.600	35.200	20.000	19.500	23.700	58.400	70.500	65.800	47.000	39.900	39.000
3	67.100	49.300	38.000	20.900	19.000	23.000	64.200	74.900	55.800	46.100	40.200	39.000
4	65.400	47.700	31.400	20.300	20.000	23.200	63.000	63.800	50.600	45.200	47.700	38.200
5	65.400	44.300	30.100	21.200	20.500	52.000	55.200	66.700	50.000	43.700	48.600	39.600
6	68.000	43.700	28.600	22.300	20.500	126.000	48.300	71.400	50.300	45.500	43.400	39.300
7	61.800	44.600	27.300	22.500	21.000	136.000	46.100	61.100	62.600	46.700	41.000	39.600
8	57.000	43.400	26.300	22.500	20.500	118.000	44.600	63.800	59.200	50.000	41.000	39.600
9	61.800	43.100	26.100	23.000	21.500	112.000	44.300	62.200	56.600	50.000	40.700	38.500
10	71.400	43.400	25.300	23.000	24.400	99.900	44.900	55.800	61.800	48.600	41.300	37.400
11	66.200	42.800	24.600	23.200	50.200	81.500	43.100	51.000	54.400	48.300	44.000	36.300
12	60.700	42.200	24.600	23.700	47.600	74.000	41.900	47.000	47.700	46.700	42.200	35.500
13	61.800	41.900	26.300	24.200	32.700	78.000	40.700	43.400	42.500	42.800	38.200	34.900
14	59.600	41.800	23.900	24.400	28.600	101.000	40.700	42.800	39.000	41.900	38.000	35.200
15	76.700	41.000	22.300	23.700	26.400	120.000	40.400	44.900	39.600	51.300	38.000	38.000
16	83.000	41.000	19.900	15.700	25.400	97.500	39.900	46.700	40.200	58.100	40.700	40.700
17	73.600	40.700	17.400	10.800	25.100	76.700	42.500	89.000	40.400	53.000	41.900	40.400
18	63.000	41.000	14.800	10.000	24.900	61.400	44.600	130.000	40.400	47.000	39.300	38.500
19	58.100	41.900	13.400	9.500	24.600	61.100	43.100	109.000	42.800	47.000	38.500	37.400
20	54.400	44.900	13.400	9.000	24.200	70.500	42.200	94.000	44.300	47.000	39.000	36.800
21	50.300	47.700	17.600	10.000	25.100	69.600	42.800	79.500	46.700	44.000	40.400	37.400
22	48.300	46.400	24.900	11.000	31.600	71.800	43.100	67.500	46.400	41.000	41.000	38.000
23	51.600	44.900	25.300	8.000	30.200	65.400	41.900	55.800	46.700	41.600	41.600	37.100
24	61.800	43.700	23.200	7.530	25.600	56.200	40.700	52.000	45.500	42.200	41.300	36.000
25	58.400	42.500	24.200	9.420	24.200	48.600	39.600	54.100	41.300	40.700	41.300	36.800
26	53.000	41.900	25.800	10.600	24.200	43.700	38.800	74.000	42.300	39.600	39.600	36.600
27	49.600	41.300	25.300	13.000	23.700	42.500	39.600	96.300	44.900	39.000	38.000	36.000
28	48.600	40.400	23.200	16.000	23.700	43.700	41.300	125.000	74.900	39.300	38.000	37.100
29	46.400	40.200	21.800	18.000		45.200	48.300	134.000	85.700	39.000	38.800	38.800
30	45.500	39.600	18.700	18.000		47.400	44.300	130.000	65.800	38.500	41.600	38.200
31	46.700		16.500	19.500		56.200		117.000		39.600	38.000	

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MISSOURI RIVER AT MISSOURI CITY, MISSOURI

Samples are collected at the intake of the North West Electric Power Cooperative.

Liberty, Missouri, the nearest upstream community, discharges raw sewage from an 8,200 population into a tributary 9 miles above the station. The cities of Kansas City, Kansas, Kansas City, Missouri, and North Kansas City, Missouri contribute approximately 1.3 million BOD population equivalents of sewage and industrial wastes about 40 miles upstream. Primary treatment plants are either in planning or under construction in upstream areas and should relieve this pollution.

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Station Location:	Missouri River at Missouri City, Missouri
Major Basin:	Missouri River
Minor Basin:	Lower Missouri below Niobrara River
Station at:	39°14' Latitude 94°18' Longitude
Miles above mouth:	344
Activation Date:	January 29, 1962
Sampled by:	North West Electric Power Cooperative, Inc.
Field Analysis by:	U.S. Public Health Service
Other Cooperating Agencies:	Missouri Water Pollution Board Missouri Department of Public Health
Hydrologic Data:	
Nearest pertinent gaging station:	Kansas City, Missouri
Gaging station operated by:	U.S. Geological Survey
Drainage area at gaging station:	489,200 square miles
Period of record:	1897 to present
Average discharge in record period:	55,290 cfs.
Maximum discharge in record period:	573,000 cfs.
Minimum discharge in record period:	about 1,500 cfs.

Remarks: Discharge figures not adjusted for flows in Blue River which drains an area of 188 square miles and which enters Missouri River between gage and pollution surveillance station. Flow partially regulated by operations of reservoirs upstream and on tributaries.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
1-7-63	0.12
1-28-63	0.03
3-11-63	0.05
3-19-63	0.04
3-25-63	0.04
4-8-63	0.04
4-15-63	0.04
4-22-63	0.04
4-29-63	0.05
5-6-63	0.04
5-15-63	0.06
5-21-63	0.05
5-27-63	0.04
6-4-63	0.03
6-10-63	0.05
6-17-63	0.05
6-25-63	0.04
7-9-63	0.03
7-11-63	0.04
7-23-63	0.04
7-31-63	0.04
8-15-63	0.07
8-20-63	0.05
8-27-63	0.04
9-3-63	0.06
9-10-63	0.05
9-24-63	0.07

ELEMENTAL ANALYSES

		Composite 10/1/62 to 12/31/62	Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.40	.60
	Na	52	59
	K	6.7	7.5
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	18	13
	Cd	*5	*5
	As	*50	*50
	B	93	184
	P	*25	64
	Fe	30	33
	Mo	50	51
	Mn	1	10
	Al	–	10
	Be	*.13	*.13
	Cu	4	18
	Ag	*1	1.5
	Ni	*3	5
	Co	*10	8
	Pb	25	*13
	Cr	*3	*13
	V	*5	*26
	Ba	145	8
	Sr	275	281

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	2.6	.3	April to June	4.1	.5
January to March	–	–	July to September	–	–

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE MISSOURI

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI-BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT

MISSOURI CITY, MISSOURI 100

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON					
			DATE OF DETERMINATION		ALPHA						BETA								GROSS ACTIVITY	
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO.	DAY	YR	MO.	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
10	2	62	10	26	4	6	2	2	6	6	8	40	7	16	15	43						
10	9	62	11	30	0	1	0	1	0	1	10	11	7	10	17	15						
10	16	62	11	7	2	6	5	3	7	7	52	36	6	16	58	39						
11	6	62	12	4	4	3	5	3	9	4	29	18	30	17	59	25						
11	13	62	12	28	11	7	22	9	33	11	44	22	77	22	121	31						
11	20	62	12	6	6	5	2	3	8	6	51	19	36	16	87	24						
11	28	62	1	3	6	5	6	4	12	6	29	20	32	17	61	26						
12	4	62	12	28	6	4	6	4	12	6	18	17	45	17	63	24						
12	11	62	1	7	6	4	7	4	13	6	27	11	26	10	53	15						
12	17	62	1	9	0	1	6	4	6	4	7	14	27	14	34	24						
12	27	62	1	10	0	2	4	3	4	4	25	16	32	12	57	25						
12	31	62	1	15	1	1	5	3	6	3	7	14	36	16	43	23						
1	7	63	1	18	1	1	3	3	4	3	8	14	29	16	37	23						
1	15	63	1	23	0	1	5	4	5	4	13	13	38	16	51	22						
1	21	63	2	5	3	2	3	4	6	4	2	11	19	18	21	22						
1	28	63	2	14	0	1	6	5	6	5	22	13	45	19	67	23						
2	4	63	2	18	2	1	28	7	30	7	1	7	35	9	36	11						
2	11	63	2	26	5	5	2	3	7	6	42	21	35	18	77	28						
2	18	63	3	4	3	2	4	3	7	3	32	8	42	8	74	11						
2	25	63	4	12	1	2	5	3	6	3	20	16	42	17	62	23						
3	4	63	3	27	12	10	5	3	17	10	131	47	57	17	188	50						
3	11	63	4	1	21	17	1	2	22	17	186	45	52	7	238	46						
3	19	63	4	1	38	27	5	3	43	27	251	53	59	8	310	54						
3	25	63	4	10	0	3	3	2	3	4	196	87	66	17	262	89						
4	29	63	6	3*	9	7	2	3	11	8	79	11	40	8	119	14						
5	27	63	6	25*	21	15	2	2	23	15	194	85	44	17	238	87						
6	25	63	8	6*	18	15	3	3	21	15	201	84	52	18	253	86						
7	31	63	8	23*	14	12	2	2	16	12	154	49	20	8	174	50						
8	27	63	10	4*	10	11	7	4	17	12	129	76	39	16	168	78						
9	24	63	11	20*	3	3	5	5	8	6	27	12	45	13	72	18						

PLANKTON POPULATION

STATE MISSOURI

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI-BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT
MISSOURI CITY, MISSOURI 108

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	MICROINVERTEBRATES																					
			1ST		2ND		3RD		4TH		OTHER SPECIES PERCENT		PROTOZOA (Identifiable) Number per ml.	ROTIFERS													CRUSTACEA							NEMATODES (Identifiable) Number per liter	OTHER ANIMAL FORMS (Number per liter)
															GENERA AND COUNT LEVEL (See text for Codes)												GENERA AND COUNT LEVEL (See text for Codes)								
														NUMBER PER LITER	1ST		2ND		3RD		4TH		5TH		NUMBER PER LITER	1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT					GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	2	62	80	52	58	9	26	8	82	4	27			0											0							0	0
10	16	62	46	24	80	16	26	11	82	8	41			0											0							0	0
11	6	62	80	59	46	14	26	3	92	3	21			0											0							0	0
11	20	62	46	28	80	25	45	9	92	7	31			0											0							0	0
12	4	62	46	18	45	12	80	11	71	8	51			1											1							0	0
12	17	62	82	61	36	2	71	5	26	4	28	4	0	1											0							0	0
1	7	63	71	8	10	8	79	7	58	7	70			0											3							0	0
1	28	63	82	78	9	10	80	4	67	2	6			1											0							0	0
2	4	63	82	54	9	27	80	4	70	2	13			0											1							0	0
2	18	63	71	35	80	10	36	10	92	8	37			0											0							1	0
3	4	63																																
3	19	63																																
4	1	63																																
4	15	63	80	59	9	21	82	8	71	4	8			0											0							0	0
5	6	63																																
5	21	63																																
6	4	63	9	58	82	22	80	6	58	4	10			120	11	5	2	1							13	51	3					0	0
6	17	63																																
7	2	63																																
7	15	63																																
8	6	63																																
8	20	63																																
9	3	63	80	26	26	20	58	16	82	8	30																							
9	17	63	82	17	70	9	23	8	27	7	59																							

PLANKTON POPULATION

STATE MISSOURI

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT
MISSOURI CITY, MISSOURI

108

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	2	62	12500	40	60	1270	250	210	60	8230	2360	3760	2830	71	6	68	3	38	3	69	2	88	2	87	2	24	1	50	1	78	1	97	1
10	16	62	10600	210	60	1630	20	740	40	5670	2240	1990	700	71	5	68	4	69	4	38	3	88	3	51	3	87	2	25	1	24	1	3	1
11	6	62	2700	20	70	430	0	230	0	1460	520	1130	990	71	3	69	2	38	1	84	1												
11	20	62	4400	0	40	480	0	370	0	1620	1900	290	120	71	3	92	2	88	2	87	2	57	1	24	1	38	1	91	1	69	1		
12	4	62	1200	0	70	0	0	70	90	590	360	270	360	71	2																		
12	17	62	4700	20	110	90	0	350	0	3700	420	590	150	71	5	57	1	68	1	82	1												
1	7	63	2500	0	0	40	0	220	0	1980	240	180	110	68	4	71	2																
1	28	63	1300	0	0	40	0	220	40	920	20	20	20	71	3	51	1																
2	4	63	200	0	0	20	0	0	0	90	60	30	50																				
2	18	63	800	0	0	20	0	60	40	150	500	170	250	77	1																		
3	4	63	3400	0	0	20	0	130	110	810	2310	130	1230																				
3	19	63	500	0	0	0	0	40	0	90	350	90	440																				
4	1	63	1200	0	0	20	0	260	0	680	260	220	550	52	1																		
4	15	63	8800	0	510	1180	0	610	460	3720	2180	1300	860	71	5	77	4	17	2	51	2	88	2	63	2	38	2	25	2	26	1	91	1
5	6	63	2500	0	40	130	0	110	0	860	1320	420	1170	77	3																		
5	21	63	2600	0	0	480	0	110	0	810	1210	660	920	77	3	24	1	38	1														
6	4	63	10600	70	70	3700	0	400	0	3870	2510	2090	2460	71	5	24	4	77	4	38	4	88	3	69	2	25	2	68	1	51	1		
6	17	63	1500	0	70	140	0	160	0	410	700	250	450	77	1	84	1																
7	2	63	*	-	-	-	-	-	-	-	-	-	-																				
7	15	63	2000	0	0	570	0	110	0	950	370	570	510	38	1	35	1																
8	6	63	*	-	-	-	-	-	-	-	-	-	-																				
8	20	63	3100	0	0	1210	0	240	0	1380	280	4040	1330	38	3	84	1	25	1	52	1												
9	3	63	2900	20	0	1320	0	110	0	990	430	3310	1530	71	2	38	2	34	2	68	2	88	1										
9	17	63	2500	0	0	1330	0	140	0	880	160	1350	1010	38	3	68	2	71	2	69	1												

* TOO TURBID TO COUNT

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE MISSOURI

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI-BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT
MISSOURI CITY, MISSOURI 108

DATE OF SAMPLE					GALLONS FILTERED	EXTRACTABLES			CHLOROFORM EXTRACTABLES										
BEGINNING			END								NEUTRALS								
MONTH	DAY	YEAR	MONTH	DAY		TOTAL	CHLORO-FORM	ALCOHOL	ETHER INSOLUBLES	WATER SOLUBLES	TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
9	27	63	10	3	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* FLOW UNKNOWN

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE MISSOURI

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT MISSOURI CITY, MISSOURI

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	2	62	–	–	8.1	–	–	–	–	–	41	166	240	5	320	160	.1	495	–
10	9	62	–	–	7.8	–	–	–	–	–	18	160	268	10	550	145	.2	403	–
10	16	62	–	–	8.0	–	–	–	–	–	23	166	240	5	170	160	.2	480	–
10	30	62	–	–	7.7	–	–	–	–	–	18	170	250	5	170	180	.0	507	–
11	6	62	–	–	8.1	–	–	–	–	–	23	174	240	5	*25	170	.0	500	–
11	13	62	–	–	7.8	–	–	–	–	–	21	172	244	5	*25	180	.0	520	–
11	20	62	–	–	7.9	–	–	–	–	–	16	176	256	0	*25	195	.0	518	–
11	28	62	–	–	7.4	–	–	–	–	–	36	180	270	5	*25	200	.0	530	–
12	4	62	–	–	7.7	–	–	–	–	–	25	200	310	5	*25	190	.0	545	–
12	11	62	–	–	8.3	–	–	–	–	–	28	222	284	5	85	155	.2	560	–
12	17	62	–	–	7.9	–	–	–	–	–	48	276	344	5	*25	165	.2	619	–
12	27	62	–	–	7.7	–	–	–	–	–	29	204	412	–	*25	165	.2	520	–
12	31	62	–	–	7.7	–	–	–	–	–	36	246	350	–	*25	170	.4	583	–
1	7	63	–	–	7.8	–	–	–	–	–	37	224	296	–	*25	180	.2	575	–
1	15	63	–	–	7.8	–	–	–	–	–	47	252	324	–	*25	165	.4	590	–
1	21	63	–	–	7.7	–	–	–	–	–	49	300	348	–	*25	180	.1	715	–
1	28	63	–	–	7.9	–	–	–	–	–	30	230	340	–	*25	220	.3	670	–
2	5	63	–	–	7.7	–	–	–	–	–	40	220	292	5	*25	195	.0	610	–
2	11	63	–	–	7.8	–	–	–	–	–	29	180	228	10	140	125	.2	430	–
2	18	63	–	–	7.8	–	–	–	–	–	25	176	248	10	77	140	.3	450	–
2	25	63	–	–	7.8	–	–	–	–	–	32	196	256	5	*25	125	.3	470	–
3	4	63	–	–	7.5	–	–	–	–	–	33	200	260	5	450	130	.0	440	–
3	11	63	–	–	7.6	–	–	–	–	–	24	150	200	15	1200	90	.3	360	–
3	18	63	–	–	7.1	–	–	–	–	–	21	164	200	15	2000	65	.2	411	–
3	25	63	–	–	7.0	–	–	–	–	–	27	210	280	15	650	120	.3	530	–
4	1	63	–	–	7.0	–	–	–	–	–	21	156	240	5	340	124	.0	400	–
4	8	63	–	–	7.6	–	–	–	–	–	22	160	270	5	250	156	.1	440	–
4	15	63	–	–	7.3	–	–	–	–	–	20	172	270	5	170	210	.0	510	–
4	22	63	–	–	7.3	–	–	–	–	–	15	172	270	0	240	210	.2	540	–
4	29	63	–	–	–	–	–	–	–	–	24	176	280	5	120	210	.1	540	–
5	6	63	–	–	–	–	–	–	–	–	25	172	260	5	900	180	.1	500	–
5	15	63	–	–	–	–	–	–	–	–	26	172	280	5	200	210	.1	550	–
5	21	63	–	–	–	–	–	–	–	–	18	168	250	5	550	184	.0	480	–
5	27	63	–	–	–	–	–	–	–	–	18	156	280	10	900	184	.1	500	–
6	4	63	–	–	–	–	–	–	–	–	22	176	300	5	100	222	.0	540	–
6	11	63	–	–	–	–	–	–	–	–	22	148	230	10	1500	150	.1	440	–
6	17	63	–	–	–	–	–	–	–	–	26	164	150	10	350	200	.0	550	–
6	25	63	–	–	–	–	–	–	–	–	28	158	260	10	300	196	.2	530	–

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE MISSOURI
MAJOR BASIN MISSOURI RIVER
MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER
STATION LOCATION MISSOURI RIVER AT
MISSOURI CITY, MISSOURI

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
7	2	63	-	-	-	-	-	-	-	-	18	154	240	15	900	160	.0	440	-
7	9	63	-	-	-	-	-	-	-	-	20	156	280	5	700	190	.2	520	-
7	16	63	-	-	-	-	-	-	-	-	19	166	280	10	420	220	.1	500	-
7	23	63	-	-	-	-	-	-	-	-	23	160	260	5	100	210	.1	510	-
7	31	63	-	-	-	-	-	-	-	-	25	162	290	5	110	240	.1	550	-
8	6	63	-	-	-	-	-	-	-	-	24	148	280	5	190	220	.1	520	-
8	15	63	-	-	-	-	-	-	-	-	30	190	270	15	1200	220	.2	640	-
8	20	63	-	-	-	-	-	-	-	-	30	150	230	5	190	200	.2	570	-
8	27	63	-	-	-	-	-	-	-	-	84	162	240	5	110	220	.1	540	-
9	3	63	-	-	-	-	-	-	-	-	18	160	270	0	500	180	.0	520	-
9	10	63	-	-	-	-	-	-	-	-	17	140	280	0	100	184	.0	480	-
9	17	63	-	-	-	-	-	-	-	-	22	184	280	10	65	220	.0	560	-
9	24	63	-	-	-	-	-	-	-	-	24	152	250	5	94	200	.1	510	-

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Kansas City, Missouri
Operated by U.S. Geological Survey

STATE Missouri

MAJOR BASIN Missouri River

MINOR BASIN Lower Missouri below Niobrara River

STATION LOCATION Missouri River at Missouri City, Missouri

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	44.900	39.200	27.900	16.300	13.700	22.100	38.600	55.600	38.900	38.000	37.800	37.200
2	45.600	39.500	26.100	17.500	13.200	22.900	37.200	50.800	37.000	38.300	40.100	37.200
3	46.600	39.200	24.300	18.300	13.800	26.800	37.000	46.600	36.700	44.200	40.700	39.200
4	46.300	38.300	22.900	18.300	14.900	36.400	37.500	44.600	50.800	43.000	38.300	41.000
5	44.200	38.600	22.700	18.100	15.300	58.800	38.600	50.800	58.400	43.300	37.200	40.100
6	45.600	39.500	22.500	18.700	16.700	59.600	40.100	56.800	46.000	43.300	36.700	39.700
7	51.200	40.100	22.300	20.000	17.500	44.600	39.800	51.600	58.800	44.600	35.000	37.800
8	52.600	39.800	21.400	21.000	18.500	39.500	38.600	45.700	56.800	46.600	41.600	36.100
9	46.300	39.800	21.000	21.000	25.900	37.800	37.800	40.700	45.600	46.600	40.100	35.800
10	44.900	39.300	20.400	21.400	23.400	43.300	38.000	38.300	41.000	42.300	35.300	34.500
11	43.000	39.500	19.600	22.300	22.100	44.600	38.300	39.500	37.200	38.900	35.300	34.800
12	41.300	38.900	17.500	21.000	20.400	59.200	38.300	38.900	37.800	40.700	33.700	39.200
13	41.300	38.600	12.800	15.400	20.400	74.800	38.600	38.900	37.800	41.300	42.300	42.300
14	40.400	38.600	9.360	9.040	20.600	64.200	40.400	41.600	37.800	42.300	39.800	39.500
15	39.500	38.300	9.040	6.300	21.200	50.500	42.600	57.600	37.200	40.100	37.800	37.500
16	42.600	39.800	9.200	5.920	22.310	44.200	41.300	84.000	37.500	42.600	36.400	35.600
17	42.600	40.400	9.530	6.180	22.100	46.600	41.000	68.200	39.200	41.300	35.000	36.400
18	41.000	41.300	17.500	6.050	22.100	45.600	42.000	59.600	43.300	38.600	35.800	38.000
19	40.100	41.000	26.300	6.050	29.100	42.300	42.300	54.500	40.400	37.800	37.500	37.800
20	40.100	39.500	21.400	6.560	24.500	42.000	41.600	49.100	37.800	39.500	40.700	37.200
21	47.700	39.200	21.000	7.370	22.500	43.900	40.200	44.900	34.800	37.800	40.400	36.100
22	47.400	38.600	24.900	8.720	23.000	39.800	39.500	47.700	34.800	36.100	38.300	35.800
23	43.000	38.300	24.900	11.200	22.500	36.100	38.000	46.300	37.200	35.300	36.100	35.600
24	40.100	38.000	22.700	12.400	21.200	35.800	37.800	43.600	38.600	34.800	35.800	35.800
25	39.800	37.200	20.600	13.000	22.700	36.700	37.800	43.600	47.400	35.300	35.000	38.600
26	39.800	37.500	17.500	12.100	23.800	37.200	37.800	48.400	93.000	34.800	34.000	40.100
27	41.300	36.400	11.600	11.900	22.900	39.800	37.800	50.200	79.000	35.000	34.200	38.300
28	41.300	34.000	10.200	12.400	22.100	43.900	37.800	43.500	53.800	35.800	36.400	36.400
29	41.000	32.000	19.000	13.300		43.900	42.300	42.000	43.600	36.700	37.800	37.500
30	40.100	29.800	13.400	14.200		41.300	62.500	41.000	39.500	36.100	39.800	38.600
31	38.900		14.800	14.800		39.200		41.100		35.800	39.200	

MISSOURI RIVER AT KANSAS CITY, KANSAS

Samples are collected at the municipal water treatment plant intake. This station monitors the Missouri River above the confluence of the Kansas River and is affected by municipal and industrial discharges from St. Joseph, Missouri and Omaha, Nebraska, located 77 and 268 miles upstream, respectively.

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Station Location: Missouri River at Kansas City, Kansas

Major Basin: Missouri River

Minor Basin: Lower Missouri below Niobrara River

Station at: 39°10' Latitude 94°38' Longitude

Miles above mouth: 374

Activation Date: November 4, 1957

Sampled by: Kansas City (Kansas) Board of Public Utilities

Field Analysis by: Kansas City (Kansas) Board of Public Utilities

Other Cooperating Agencies: Kansas State Board of Health

Hydrologic Data:

Nearest pertinent gaging station: See Remarks

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: Estimated 429,000 square miles at surveillance station

Period of record: See Remarks

Average discharge in record period: Estimated 48,500 cfs. at surveillance station

Maximum discharge in record period: –

Minimum discharge in record period: –

Remarks: Flow at Kansas City computed as Missouri River at Kansas City, Missouri minus Kansas River at Bonner Springs, Kansas, with records available from 1897 and 1917, respectively.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
3-4-63	0.09
3-11-63	0.10
3-25-63	0.05
4-1-63	0.05
4-8-63	0.04
4-15-63	0.03
4-22-63	0.02
4-29-63	0.04
5-6-63	0.04
5-13-63	0.04
5-20-63	0.04
5-28-63	0.04
6-3-63	0.04
6-17-63	0.02
6-24-63	0.04
7-1-63	0.03
7-8-63	0.03
7-15-63	0.04
7-22-63	0.04
7-29-63	0.03
8-5-63	0.05
8-19-63	0.04
8-26-63	0.03
9-3-63	0.06
9-9-63	0.05
9-23-63	0.07
9-30-63	0.07

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.55	.60
	Na	57	64
	K	6.8	8.9
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	19	*5
	Cd	*5	*5
	As	*47	*48
	B	94	94
	P	*24	*24
	Fe	164	22
	Mo	33	*12
	Mn	*.9	*4.8
	Al	–	17
	Be	*.12	*.12
	Cu	4	*5
	Ag	*.9	*1.2
	Ni	*2	*5
	Co	*9	*5
	Pb	*24	*12
	Cr	*2	*12
	V	*5	*24
	Ba	164	110
	Sr	129	216

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	3.4	.4	April to June	–	–
January to March	–	–	July to September	5.0	.5

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS
WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE KANSAS

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT KANSAS CITY, KANSAS

DATE SAMPLE TAKEN			DATE OF DETERMINATION		RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON					
					ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO	DAY	YR	MO	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO	DAY	pc/g	±	pc/g	±
10	1	62	10	26	14	10	1	2	15	12	29	76	21	16	50	78						
10	8	62	11	1	-	-	-	-	-	-	91	34	32	17	83	38						
10	15	62	11	9	4	5	2	3	6	6	34	34	45	16	79	28						
10	22	62	11	8	-	-	-	-	-	-	3	90	21	14	24	91						
10	29	62	11	20	-	-	-	-	-	-	38	16	34	15	72	22						
11	26	62	12	20*	2	3	7	4	9	5	26	14	30	14	56	20						
12	31	62	1	15*	2	2	6	3	8	4	15	15	23	17	38	23						
1	28	63	2	21*	0	1	4	3	4	3	8	13	40	19	48	23						
2	25	63	3	11*	1	1	6	3	7	3	4	11	20	13	24	17						
3	25	63	4	15*	20	10	11	3	31	10	106	22	56	7	162	23						
4	29	63	5	20*	6	5	5	3	11	6	96	10	29	8	95	13						
5	28	63	6	17*	32	21	8	4	40	21	318	30	56	8	374	31						
6	24	63	7	23*	6	20	3	4	9	20	295	76	84	14	359	77						
7	29	63	8	19*	14	9	5	3	19	9	84	22	35	3	119	23						
8	26	63	9	20*	7	5	2	3	9	6	51	16	33	13	84	21						
9	30	63	10	22*	9	4	4	3	13	5	31	11	35	11	66	16						

PLANKTON POPULATION

STATE KANSAS

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT
KANSAS CITY, KANSAS 029

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml)	MICROINVERTEBRATES																							
			1ST		2ND		3RD		4TH				ROTIFERS												CRUSTACEA											
														GENERA AND COUNT LEVEL (See text for Codes)											GENERA AND COUNT LEVEL (See text for Codes)									
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT		PROTOZOA (Identifiable) (Number per ml)	NUMBER PER LITER	1ST		2ND		3RD		4TH		5TH		NUMBER PER LITER	1ST		2ND		3RD		NEMATODES (Identifiable) (Number per liter)	OTHER ANIMAL FORMS (Number per liter)
															GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	1	62	80	41	26	11	58	8	82	6	34	-	-	-											-							-	-
10	15	62	46	26	26	15	82	12	80	11	36	-	-	0											0							0	0
11	5	62	80	51	46	8	83	6	48	3	32	50	-	2											1							1	0
11	19	62	82	18	80	12	71	8	26	7	55	-	-	0											0							0	0
12	3	62	45	23	46	22	71	8	92	8	39	50	-	0											0							0	0
12	17	62	82	72	45	3	71	3	64	2	20	-	-	0											0							0	0
1	7	63	82	75	70	9	80	7	46	3	6	-	-	0											1							0	0
1	21	63	82	81	9	7	80	4	26	1	7	-	-	2											1							0	0
2	4	63	9	53	82	14	80	14	46	2	17	-	-	0											1							0	0
2	18	63	80	26	71	23	82	15	86	9	27	-	-	0											0							0	0
3	4	63	80	32	71	24	72	10	46	6	28	-	-	0											0							0	0
3	18	63										-	-	-											-							-	-
4	1	63	71	16	80	12	46	9	92	9	54	-	-	0											0							0	0
4	15	63	80	84	71	3	92	3	11	2	8	-	-	0											0							0	0
5	6	63										-	-	-											-							-	-
5	20	63										-	-	-											-							-	-
6	3	63	82	58	9	24	26	10	56	2	6	-	-	0											1							0	0
6	17	63										-	-	-											-							-	-
7	1	63										-	-	-											-							-	-
7	15	63										-	-	-											-							-	-
8	5	63										-	-	-											-							-	-
8	19	63	26	35	58	13	82	11	23	9	32	-	-	0											0							0	0
9	3	63	27	23	82	12	23	12	64	8	45	-	-	3											0							0	0
9	16	63										-	-	-											-							-	-

PLANKTON POPULATION

STATE KANSAS

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT KANSAS CITY, KANSAS

29

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	3800	0	380	0	0	0	0	1480	1900	2530	2110	71	3	87	2	92	2	16	2	88	2	68	1								
10	15	62	12800	410	0	1660	830	850	0	5800	3230	3310	1160	71	5	68	4	88	3	38	3	69	3	87	2	84	2	83	2	97	2	3	2
11	5	62	3200	20	90	320	0	90	0	2250	450	2090	950	71	4	38	1																
11	19	62	1100	0	50	70	0	20	0	520	830	290	470	71	2	88	1																
12	3	62	1300	0	90	140	0	20	140	520	380	720	500	71	2																		
12	17	62	2700	20	70	130	0	180	0	2240	20	150	130	71	4																		
1	7	63	900	0	0	0	0	90	0	730	90	150	130	71	3																		
1	21	63	400	0	0	0	0	130	0	220	0	0	0	71	1																		
2	4	63	700	0	0	20	0	90	0	530	110	70	20	71	2																		
2	18	63	800	0	80	40	0	130	170	190	210	110	340	77	2																		
3	4	63	4700	0	170	0	0	230	170	1810	2290	800	990	77	4	71	4	88	1	51	1	17	1										
3	18	63	600	0	0	0	0	130	0	230	230	40	340																				
4	1	63	3200	0	0	0	0	320	610	950	1340	780	920	71	3	77	3	51	2	65	1												
4	15	63	9900	0	550	970	0	570	550	4750	2520	2670	1470	71	5	77	4	51	2	65	2	17	2	24	2	88	1	92	1	38	1	26	1
5	6	63	800	0	0	60	0	60	0	320	340	130	150																				
5	20	63	2000	0	20	60	0	20	0	860	1030	80	250	77	2																		
6	3	63	6900	0	90	3700	0	240	0	2130	750	1100	860	24	5	71	4	38	3	25	1	68	1	69	1	88	1	35	1	51	1		
6	17	63	1300	0	20	330	0	70	0	370	550	570	1060	77	1	38	1																
7	1	63	*	-	-	-	-	-	-	-	-	-	-																				
7	15	63	700	0	0	150	0	60	0	390	120	270	250																				
8	5	63	1200	0	0	350	0	150	0	410	250	810	210	38	1																		
8	19	63	3100	0	0	840	0	150	0	1620	440	3670	1180	68	3	38	2	69	1	71	1												
9	3	63	2700	0	20	1190	0	220	0	840	420	1030	370	38	2	68	2	69	1	88	1	71	1	35	1								
9	16	63	2400	0	0	610	0	160	0	680	970	590	540	38	2	84	1																

* TOO TURBID TO COUNT

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE KANSAS

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT KANSAS CITY, KANSAS

29

DATE OF SAMPLE BEGINNING MONTH	DAY	YEAR	END MONTH	DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	CHLORO-FORM	ALCOHOL	CHLOROFORM EXTRACTABLES ETHER INSOLUBLES	WATER SOLUBLES	NEUTRALS TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	1	62	10	16	5024	94	13	81	0	2	8	2	1	5	0	1	1	0	1
10	18	62	11	2	4857	83	16	67	0	3	7	1	1	5	0	2	1	0	3
11	9	62	11	26	6631	70	14	56	0	2	8	2	1	5	0	2	1	0	1
12	1	62	12	13	4375	175	18	157	0	3	11	2	2	7	0	2	0	0	2
12	21	62	1	7	6530	153	26	127	-	-	-	-	-	-	-	-	-	-	-
1	21	63	2	4	6103	153	35	118	1	8	13	1	1	11	0	4	3	1	5
2	5	63	2	19	5571	193	49	144	-	-	-	-	-	-	-	-	-	-	-
2	25	63	3	11	4790	118	27	91	0	5	15	2	2	10	1	4	2	0	1
3	19	63	4	4	4292	70	12	58	-	-	-	-	-	-	-	-	-	-	-
4	5	63	4	18	4885	82	17	65	0	2	10	3	2	5	0	2	1	0	2
5	4	63	5	17	3470	108	34	74	-	-	-	-	-	-	-	-	-	-	-
5	24	63	6	7	4156	74	17	57	0	3	9	2	1	6	0	3	1	0	1
6	14	63	6	28	4708	62	12	50	-	-	-	-	-	-	-	-	-	-	-
7	2	63	7	16	3562	84	29	55	1	9	7	1	1	5	0	3	2	1	6
7	22	63	8	6	5531	82	21	61	-	-	-	-	-	-	-	-	-	-	-
8	12	63	8	26	4180	80	14	66	0	2	7	1	1	5	0	2	1	0	2
9	5	63	9	20	5031	74	23	51	-	-	-	-	-	-	-	-	-	-	-
9	24	63	10	10	4955	103	27	76	1	7	9	2	1	6	0	3	2	1	4

CHEMICAL. PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE KANSAS

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT

KANSAS CITY, KANSAS

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	16.7	7.1	8.0	3.0	64	1.9	6.2	.1	16	164	233	4	1100	208	.4	469	16000
10	8	62	17.6	7.5	7.9	2.3	47	2.9	7.0	.0	14	160	250	4	430	174	-	492	29000
10	15	62	21.3	7.8	8.0	5.6	41	2.2	6.9	.0	16	160	245	6	320	189	.5	503	37000
10	22	62	14.8	8.3	7.8	4.1	62	.8	6.9	.1	13	147	257	7	2400	161	.3	426	-
11	5	62	8.4	9.8	8.0	1.5	35	1.4	-	.0	17	168	257	6	210	207	.3	523	20000
11	19	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26000
11	26	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5000
12	3	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20000
12	11	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28000
12	17	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34000
12	26	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48000
1	7	63	.6	12.4	8.0	3.2	32	1.9	6.9	.3	25	209	304	2	90	189	.4	586	53000
1	14	63	.1	12.8	7.9	2.1	27	.8	5.3	.2	26	208	296	3	50	181	.4	568	8000
1	21	63	.2	12.2	7.8	2.0	9	.6	5.9	.4	24	205	368	3	20	192	.3	643	-
1	28	63	.7	11.0	7.8	1.5	9	.7	6.9	.4	20	227	339	2	20	241	.4	667	2300
2	4	63	.6	-	7.8	-	-	-	-	-	31	204	298	2	25	211	-	-	9000
2	11	63	.1	8.9	7.7	5.2	29	.6	10.6	.5	26	174	235	2	200	138	.4	479	21000
2	18	63	.6	10.3	7.9	4.8	21	.5	10.2	.4	20	180	246	8	110	149	.6	462	39000
2	25	63	.3	11.9	7.6	2.7	16	.9	8.9	.4	26	190	260	6	115	147	.5	473	13000
3	4	63	.9	11.5	7.9	5.6	24	.8	9.5	.4	24	191	253	3	270	150	.5	486	78000
3	11	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30000
3	18	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	46000
3	25	63	9.0	8.7	8.0	7.9	68	-	12.9	.4	-	168	322	10	1300	109	.4	400	64000
4	1	63	13.7	7.8	7.9	3.6	31	3.1	9.4	.1	17	158	215	4	500	131	.4	404	120000
4	8	63	13.6	8.1	7.8	-	26	2.5	7.4	.0	18	163	245	4	380	163	.4	452	16000
4	11	63	-	10.1	7.9	9.6	80	.7	-	.5	20	140	181	10	1500	90	.6	345	-
4	15	63	13.2	8.3	8.0	3.0	25	-	-	.0	20	170	263	3	270	215	.4	555	40000
4	18	63	-	9.6	7.8	7.5	107	.9	13.0	.5	13	141	-	20	1600	95	.4	336	-
4	22	63	15.8	7.6	8.0	2.6	24	-	-	.0	18	172	291	4	280	229	.3	568	50000
4	29	63	13.4	8.5	8.0	1.9	19	1.8	5.4	.0	19	163	186	4	230	231	.3	568	81000
5	6	63	16.6	8.2	7.8	4.2	141	.5	3.6	.1	15	157	246	4	2400	195	.3	494	70000
5	13	63	21.9	7.1	8.0	2.2	27	1.3	8.9	.0	20	165	264	4	330	227	.4	555	16000
5	20	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17000
5	27	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20000
5	28	63	16.9	-	8.0	-	24	-	-	.0	17	159	246	4	320	217	.3	546	-
6	3	63	22.2	7.3	7.9	1.9	25	2.0	6.2	.0	15	171	284	4	250	234	.4	577	12000
6	10	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47000
6	17	63	24.4	6.9	8.0	1.3	34	-	-	.0	17	166	267	6	500	222	.3	546	-
6	18	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30000

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE KANSAS

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT KANSAS CITY, KANSAS

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
6	24	63	24.8	6.3	8.0	2.2	37	2.0	8.9	.1	17	162	260	5	625	202	.4	520	18000
7	1	63	28.5	5.5	7.7	2.8	66	.9	2.9	.0	12	136	212	4	1500	161	.4	–	100000
7	8	63	27.3	6.2	7.9	–	25	2.0	9.0	.0	24	159	270	5	340	228	.3	536	40000
7	15	63	26.4	5.9	7.9	1.8	35	2.0	9.0	.0	16	163	280	5	680	210	.4	524	25000
7	22	63	28.4	5.8	7.9	1.6	24	2.5	9.0	.0	21	162	253	10	400	144	.4	576	22000
7	29	63	26.6	6.3	7.9	1.3	19	2.1	6.2	.0	14	164	26	4	240	240	.4	580	22000
8	5	63	27.7	5.9	7.9	1.7	26	2.4	10.8	.0	16	151	270	4	400	–	.3	525	13000
8	13	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	100000
8	19	63	22.6	6.4	7.9	1.9	18	2.1	7.0	.0	18	150	243	4	240	212	.3	490	60000
8	26	63	25.0	6.4	8.0	1.3	17	2.0	6.5	.0	17	162	270	4	170	226	.4	539	21000
9	3	63	–	6.1	8.0	1.2	17	2.0	7.4	–	16	152	236	4	220	214	.3	519	53000
9	9	63	24.8	6.6	7.9	1.6	18	2.0	6.9	.0	16	154	236	4	180	210	.2	511	13000
9	16	63	20.8	7.1	7.9	1.7	21	2.6	6.2	.0	17	151	241	3	320	197	.4	–	25000
9	23	63	20.8	7.1	8.0	1.6	15	2.0	5.6	.0	18	151	245	3	180	218	.5	530	28000
9	30	63	18.8	7.6	8.0	1.9	17	1.6	5.0	.0	17	158	242	4	180	206	.5	505	–

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Computed Data for Kansas City, Kansas
Operated by U.S. Geological Survey

STATE: Kansas

MAJOR BASIN: Missouri River

MINOR BASIN: Lower Missouri below Niobrara River

STATION LOCATION: Missouri River at Kansas City, Kansas

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	37.500	34.200	25.100	13.800	11.800	19.400	34.800	53.100	33.900	35.400	35.900	34.700
2	39.200	34.500	23.300	15.000	11.000	20.500	33.800	48.300	32.200	30.600	38.200	35.100
3	41.200	34.500	21.600	15.700	11.300	23.800	33.500	42.300	32.900	33.900	39.000	37.200
4	40.700	34.600	20.300	15.700	11.900	31.600	34.000	38.800	47.900	32.700	36.600	39.000
5	38.800	34.800	20.100	15.500	11.700	48.300	35.300	44.400	55.600	32.600	35.200	38.200
6	37.400	36.100	19.900	16.200	13.200	47.600	36.900	50.100	43.200	33.300	34.500	37.300
7	34.100	36.700	19.800	17.500	13.700	36.800	36.500	46.200	55.600	34.600	33.000	36.100
8	37.100	36.400	18.900	18.500	14.100	33.400	34.800	41.200	53.700	37.400	39.800	34.500
9	37.500	36.400	18.600	18.600	21.200	32.300	33.800	11.400	42.800	39.200	38.400	34.200
10	38.200	36.600	17.900	19.000	18.900	38.000	34.100	35.300	38.400	36.300	33.800	32.600
11	37.600	36.300	17.200	20.400	17.900	39.600	34.400	36.500	35.000	34.400	33.800	31.700
12	36.600	35.700	15.900	19.800	17.300	53.900	34.500	36.200	35.800	36.900	32.200	35.800
13	37.200	35.500	11.000	13.900	18.400	69.000	35.000	36.200	35.700	37.800	40.900	39.000
14	36.400	35.500	7.360	7.240	17.800	57.400	37.200	38.900	35.900	36.900	38.400	36.500
15	35.700	35.300	6.940	4.400	18.000	44.200	39.600	54.000	35.400	34.300	36.300	34.800
16	38.900	36.600	7.000	4.020	18.500	38.800	38.500	79.600	34.900	32.900	34.800	32.900
17	38.900	37.200	7.230	4.380	17.400	41.400	38.200	59.200	33.600	33.300	33.400	32.900
18	37.300	37.900	15.100	4.350	17.700	40.600	39.200	52.400	35.200	32.400	33.600	33.400
19	36.600	37.700	23.900	4.450	25.100	37.700	39.500	49.500	34.600	32.500	34.700	33.400
20	36.400	36.200	19.100	5.160	20.500	37.000	38.900	44.900	33.300	34.000	37.800	33.300
21	44.600	35.800	18.800	6.070	19.000	38.600	37.600	38.500	30.800	33.200	37.100	32.600
22	44.000	35.300	22.800	7.420	19.700	35.000	36.900	38.100	31.500	32.100	33.900	33.300
23	39.600	35.100	22.800	10.000	19.500	31.300	35.500	38.400	33.500	31.300	32.100	33.100
24	36.800	34.800	20.600	11.200	18.400	30.700	35.400	38.400	34.800	31.100	32.100	33.300
25	36.600	34.500	19.500	11.800	19.900	31.600	35.500	40.300	43.400	32.100	32.000	36.000
26	35.500	34.800	15.600	11.000	21.000	32.200	35.500	40.800	88.600	32.000	31.300	37.200
27	35.800	33.700	10.100	10.800	20.100	35.100	35.500	41.000	75.000	32.500	31.500	35.600
28	35.900	31.200	8.500	11.300	19.300	39.400	35.400	36.300	50.900	33.500	33.600	32.200
29	35.600	29.100	17.000	12.100		39.600	39.900	36.400	41.200	34.600	34.900	32.200
30	34.700	26.900	11.200	12.900		37.100	60.000	36.400	37.000	34.100	36.700	32.200
31	33.600		12.400	13.500		35.100		35.900		33.900	36.600	

Computed as sum of Missouri River at Kansas City, Missouri minus the Kansas River at Bonner Springs, Kansas.

MISSOURI RIVER AT ST. JOSEPH, MISSOURI

Samples are collected at the municipal water treatment plant intake. This station is located approximately 180 miles downstream from Omaha, Nebraska and is affected by municipal and industrial discharges from the Omaha area. The mineral quality at St. Joseph is affected by waters from the Platte River.

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Station Location: Missouri River at St. Joseph, Missouri

Major Basin: Missouri River

Minor Basin: Lower Missouri below Niobrara River

Station at: 39°48' Latitude 94°52' Longitude

Miles above mouth: 451

Activation Date: December 16, 1957

Sampled by: St. Joseph Water Company

Field Analysis by: St. Joseph Water Company

Other Cooperating Agencies: Missouri Department of Public Health
Missouri Water Pollution Board

Hydrologic Data:

Nearest pertinent gaging station: At St. Joseph, Missouri

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 424,300 square miles

Period of record: 1928 to present

Average discharge in record period: 37,050 cfs.

Maximum discharge in record period: 397,000 cfs.

Minimum discharge in record period: 2,300 cfs.

Remarks: Flows affected by reservoir operations.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
3-4-63	0.09
3-11-63	0.10
3-25-63	0.06
4-1-63	0.07
4-8-63	0.05
4-15-63	0.07
4-22-63	0.04
4-29-63	0.04
5-6-63	0.05
5-13-63	0.04
5-27-63	0.03
6-3-63	0.03
6-10-63	0.02
6-17-63	0.03
6-24-63	0.04
7-8-63	0.03
7-15-63	0.04
7-22-63	0.04
7-29-63	0.03
8-5-63	0.03
8-12-63	0.06
8-19-63	0.05
8-26-63	0.04
9-2-63	0.04
9-30-63	0.05

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	1.26	.65
	Na	60	62
	K	7.3	8.6
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	*10	7
	Cd	*5	*5
	As	*50	*47
	B	78	106
	P	*13	*24
	Fe	43	47
	Mo	*5	*12
	Mn	*2.6	*4.7
	Al	–	118
	Be	*.13	*.12
	Cu	*5	5
	Ag	*1	*1.2
	Ni	*5	*5
	Co	*10	*5
	Pb	*13	*12
	Cr	*3	*12
	V	*5	*24
	Ba	103	132
	Sr	500	244

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	1.9	.3	April to June	6.2	.8
January to March	–	–	July to September	–	–

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE MISSOURI

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT ST. JOSEPH, MISSOURI 30

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON					
			DATE OF DETERMINATION		ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO	DAY	YR	MO	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO	DAY	pc/g	±	pc/g	±
10	2	62	11	1	–	–	–	–	–	–	25	20	21	16	46	26						
10	9	62	11	5	–	–	–	–	–	–	18	11	17	11	35	16						
10	15	62	11	14	–	–	–	–	–	–	12	16	32	15	44	22						
10	22	62	11	13	9	10	2	2	11	10	93	20	12	6	105	21						
10	29	62	11	21	–	–	–	–	–	–	27	18	41	17	68	25						
11	5	62	12	26	3	2	10	4	13	4	18	13	45	14	63	19						
12	24	62	1	22*	0	1	5	3	5	3	15	15	17	17	32	23						
1	28	63	2	20*	0	1	6	4	6	4	0	14	26	18	26	23						
2	18	63	3	27*	1	1	4	3	5	3	21	14	27	16	48	21						
3	25	63	4	18*	43	22	3	2	46	22	245	95	53	15	298	96						
4	29	63	5	22*	16	10	2	2	18	10	124	24	36	8	160	25						
5	27	63	6	17*	5	12	2	3	7	12	158	40	54	8	212	41						
6	25	63	7	23*	78	33	11	5	89	38	615	94	59	14	674	95						
7	29	63	9	9*	9	6	5	3	14	7	58	11	34	8	92	14						
8	26	63	9	20*	4	4	2	1	6	4	35	15	31	9	66	17						
9	30	63	10	22*	8	5	4	3	12	6	90	12	32	11	82	16						

PLANKTON POPULATION

STATE MISSOURI

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT

ST. JOSEPH, MISSOURI 030

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	PROTOZOA (Identifiable) Number per ml.	MICROINVERTEBRATES																			
			1ST		2ND		3RD		4TH					ROTIFERS											CRUSTACEA							NEMATODES (Identifiable) Number per liter	OTHER ANIMAL FORMS (Number per liter)
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)										NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)							
															1ST		2ND		3RD		4TH		5TH			1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	2	62	80	45	58	21	26	6	56	3	25	-	-	-											-							-	-
10	15	62	82	23	80	17	46	15	26	9	36	-	-	0											0							0	0
11	2	62	82	18	80	17	30	15	70	7	43	-	-	0											0							0	0
12	3	62	82	51	46	7	64	5	65	3	34	20	-	0											0							0	0
12	17	62	82	41	45	10	71	9	92	4	36	-	-	1											0							0	0
1	7	63	82	20	80	12	46	7	70	5	56	-	-	0											1							0	0
1	21	63	82	73	80	6	9	4	27	2	15	-	-	1											1							0	0
2	11	63	71	37	80	24	86	8	9	3	28	150	-	0											0							0	0
2	23	63	80	28	71	19	9	8	86	8	37	-	-	0											1							0	0
3	6	63										-	-	-											-							-	-
3	18	63										-	-	-											-							-	-
4	2	63										-	-	-											-							-	-
4	15	63	80	50	9	20	45	7	71	5	18	-	-	0											0							0	0
5	6	63										-	-	-											-							-	-
5	20	63										-	-	-											-							-	-
6	3	63	9	81	82	8	26	3	58	3	5	-	-	0											0							0	0
6	17	63										-	-	-											-							-	-
7	8	63										-	-	-											-							-	-
7	15	63										-	-	-											-							-	-
8	5	63										-	-	-											-							-	-
8	19	63	26	41	58	17	80	12	70	6	24	-	-	-											-							-	-
9	2	63										-	-	-											-							-	-
9	16	63										-	-	-											-							-	-

PLANKTON POPULATION

STATE MISSOURI

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT ST. JOSEPH, MISSOURI 30

DATE OF SAMPLE			ALGAE (Number per milliliter)										MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																			
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS		INERT DIATOM SHELLS		1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILA-MENT-OUS	COCCOID	FILA-MENT-OUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	2	62	13900	250	40	2460	210	330	0	7990	2610	2480	660	71	6	38	4	68	3	24	2	88	2	82	2	25	2	51	1	81	1	3	1
10	15	62	5400	140	180	1220	0	270	0	1800	1760	1010	680	71	3	69	3	38	2	84	2	88	2	87	1	26	1	68	1	27	1	92	1
11	2	62	6000	0	0	750	0	370	0	3270	1570	910	330	71	4	68	3	88	3	38	2	69	2	51	2	87	1	24	1				
12	3	62	1400	0	20	70	0	20	0	900	380	470	630	71	3	87	1																
12	17	62	4100	0	0	0	0	440	0	3020	660	40	0	71	5	88	1	57	1	68	1	51	1										
1	7	63	2900	0	0	20	0	0	0	2590	270	220	340	71	4	68	1																
1	21	63	1000	0	0	0	0	20	200	700	90	20	20	71	3	65	1																
2	11	63	1000	0	20	0	0	40	40	340	550	110	550	71	2	88	1																
2	23	63	1400	0	0	20	0	0	130	440	810	40	310	77	2	71	2																
3	6	63	2100	0	0	0	0	80	0	340	1640	40	780																				
3	18	63	800	0	0	20	0	80	40	270	420	320	760																				
4	2	63	2800	0	0	40	0	240	90	1470	950	440	640	77	3	51	1																
4	15	63	7200	0	0	220	0	240	0	5960	770	1390	530	71	6	88	1	51	1														
5	6	63	2600	0	0	80	0	130	110	1010	1320	250	630	77	1																		
5	20	63	2300	0	0	370	0	70	0	880	950	290	590	77	2	38	1																
6	3	63	13300	40	250	4180	0	420	380	3930	4140	1340	1370	77	5	71	5	24	4	38	4	68	3	69	2	51	2	63	2	26	1	17	1
6	17	63	2900	0	20	480	0	90	110	790	1430	310	370	77	2	26	2																
7	8	63	*	-	-	-	-	-	-	-	-	-	-																				
7	15	63	*	-	-	-	-	-	-	-	-	-	-																				
8	5	63	3700	0	0	1030	0	310	0	2020	330	790	510	38	3	59	2																
8	19	63	3200	20	0	930	0	380	50	1310	520	1900	480	68	2	38	2	69	2	88	1	71	1	51	1								
9	2	63	-	-	-	-	-	-	-	-	-	-	-																				
9	16	63	4800	0	0	860	0	450	20	2260	1180	1090	700	38	2	51	2	69	1	84	1												

* TOO TURBID TO COUNT

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE MISSOURI

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT ST. JOSEPH, MISSOURI 30

DATE OF SAMPLE BEGINNING MONTH	DAY	YEAR	END MONTH	DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	CHLORO-FORM	ALCOHOL	CHLOROFORM EXTRACTABLES ETHER INSOLUBLES	WATER SOLUBLES	NEUTRALS TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
4	8	63	4	24	5000	125	31	94	1	9	11	1	2	8	0	3	2	1	4
5	1	63	5	11	5000	66	12	54	1	2	7	1	1	5	0	1	1	0	0
6	3	63	6	13	5041	96	35	61	2	10	9	1	1	7	0	4	4	1	5
7	2	63	7	12	5000	86	29	57	1	9	6	0	1	5	0	2	3	1	7
8	2	63	8	13	4959	93	30	63	1	10	9	1	1	6	1	4	2	0	4
9	3	63	9	19	5187	74	25	49	1	7	7	0	1	6	0	3	2	1	4

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE MISSOURI

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT ST. JOSEPH, MISSOURI

30

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	2	62	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	31000
10	5	62	20.0	7.4	8.1	2.4	–	3.0	–	.2	35	168	228	–	250	177	.1	480	–
10	8	62	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	120000
10	11	62	20.0	7.2	8.2	1.9	–	3.0	5.0	.2	35	164	236	–	300	180	.1	519	–
10	15	62	–	7.6	8.3	2.0	–	–	–	.1	39	164	236	–	250	186	.1	450	3700
10	22	62	15.0	7.9	8.1	3.2	–	–	–	.1	28	152	212	–	170	156	.1	442	170000
10	29	62	10.0	–	8.1	–	–	–	–	.1	30	168	236	0	140	193	.1	513	–
10	30	62	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	13000
11	5	62	12.0	8.0	7.9	2.0	–	3.0	5.0	.1	25	164	240	–	25	206	.1	523	–
11	13	62	12.0	8.4	7.9	2.0	–	–	–	.1	25	168	148	10	150	201	.0	487	–
11	19	62	12.0	7.6	8.1	1.6	–	3.0	5.7	.2	30	168	248	5	150	196	.1	540	–
11	26	62	5.0	7.9	8.1	1.4	–	–	–	–	–	168	248	–	150	202	–	496	–
12	3	62	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	20000
12	4	62	5.0	8.6	8.1	1.7	–	3.0	6.0	.1	24	206	284	5	25	170	.1	503	–
12	10	62	5.0	–	8.1	–	–	3.5	6.5	.1	29	204	276	0	25	172	.0	526	*200
12	17	62	1.1	–	7.7	–	–	–	–	.5	32	260	332	–	40	210	.3	593	*200
12	24	62	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	15000
12	31	62	1.1	12.4	7.9	2.5	–	3.0	6.0	.4	37	224	308	10	50	204	.3	563	3400
1	7	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10000
1	8	63	1.1	10.0	8.0	2.5	–	–	–	.4	35	202	280	5	35	179	.3	579	–
1	14	63	1.1	–	7.7	–	–	4.0	6.0	.3	38	224	300	0	25	–	.1	–	500
1	17	63	1.1	10.8	8.0	2.5	–	3.6	5.6	.3	37	268	452	–	25	–	.1	–	–
1	21	63	.5	12.0	8.0	2.4	–	4.0	–	.3	39	280	336	10	25	–	.1	–	100
1	28	63	.6	–	7.9	–	–	4.6	6.0	.4	42	240	324	10	25	–	.0	–	*200
2	12	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	4600
2	18	63	1.1	11.0	7.9	2.7	–	–	–	.5	23	208	238	10	95	–	.3	–	34000
2	22	63	1.1	10.0	7.8	3.9	–	4.5	5.5	.4	25	180	260	0	50	–	.4	–	–
2	25	63	3.3	11.7	7.8	2.5	–	4.0	6.5	.5	29	188	264	0	100	–	.3	–	6000
3	6	63	1.1	10.8	7.7	6.0	–	–	8.6	.5	19	150	206	30	3700	86	.5	325	–
3	13	63	2.2	9.0	7.9	3.5	–	5.0	8.6	.6	20	123	180	20	5000	86	.3	310	–
3	18	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	130000
3	20	63	4.4	9.3	7.8	6.0	–	–	–	.6	20	180	196	30	3300	102	.3	352	–
3	25	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	240000
3	27	63	5.5	7.4	7.7	6.2	–	–	–	.4	23	180	244	20	2400	96	.3	320	–
4	1	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	90000
4	4	63	11.6	7.8	7.8	3.2	–	3.5	5.0	.3	20	180	228	10	350	–	.1	–	–
4	8	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	50000
4	9	63	12.2	8.1	7.7	2.1	–	3.0	5.0	.3	23	172	256	–	350	–	.0	–	–
4	15	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	20000

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE MISSOURI
MAJOR BASIN MISSOURI RIVER
MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER
STATION LOCATION MISSOURI RIVER AT ST. JOSEPH, MISSOURI 30

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
4	17	63	15.5	8.1	7.8	2.7	-	4.0	5.5	.3	24	168	268	-	256	132	.1	460	-
4	22	63	14.4	9.1	7.8	2.1	-	3.5	5.8	.4	32	184	272	-	210	157	.0	510	-
4	29	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	360000
5	5	63	13.3	8.0	7.6	2.4	-	-	-	-	27	176	236	-	3340	-	.0	-	-
5	6	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	380000
5	14	63	17.7	-	7.6	-	-	-	-	.4	27	150	210	-	5650	-	.1	-	-
5	20	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*100
5	21	63	15.5	8.2	7.6	3.0	-	-	-	.3	22	150	240	-	280	-	.1	-	-
5	27	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70000
6	3	63	21.1	7.2	7.8	2.0	-	.3	6.0	.4	27	170	272	-	198	-	.0	-	-
6	10	63	23.3	6.2	7.8	2.0	-	.4	7.0	.3	25	160	210	-	2820	-	.1	-	83000
6	17	63	22.2	8.2	7.4	2.4	-	-	-	.3	25	168	240	20	3000	-	.0	-	-
6	24	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23000
6	27	63	25.6	5.8	7.4	3.2	-	-	-	.3	22	120	188	20	6000	-	.2	-	-
7	2	63	26.1	6.0	7.4	-	-	4.0	6.5	.3	27	146	210	-	1500	-	.0	-	35000
7	8	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	65000
7	10	63	26.1	5.6	7.8	4.5	-	-	-	.4	37	168	250	-	600	-	.1	-	-
7	22	63	26.1	6.2	7.6	3.2	-	3.5	6.0	.3	25	156	220	-	230	-	.0	-	20000
7	29	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	19000
8	5	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12000
8	12	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	26000
8	14	63	26.7	5.8	7.9	1.1	-	3.0	6.2	.1	25	160	232	10	900	-	.0	-	-
8	19	63	24.4	7.3	7.8	2.5	-	3.0	6.0	.1	27	176	250	20	206	-	.0	-	50000
8	26	63	24.4	7.0	7.9	2.5	-	-	-	.1	29	160	210	-	95	-	.0	-	10000
9	2	63	24.4	7.6	7.9	2.0	-	-	-	.1	19	168	200	-	220	-	.0	-	50000
9	9	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	90000
9	10	63	21.8	6.0	8.1	1.8	27	3.2	10.6	.2	20	148	185	10	200	156	.1	526	-
9	16	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33000
9	17	63	21.6	6.8	8.0	1.9	18	2.6	8.8	.1	21	156	232	-	350	171	.1	520	-
9	23	63	20.2	5.9	8.0	2.0	59	3.3	9.6	.2	22	142	238	-	150	171	.0	470	21000
9	30	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	120000

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at St. Joseph, Missouri
Operated by U.S. Geological Survey

STATE Missouri

MAJOR BASIN Missouri River

MINOR BASIN Lower Missouri below Niobrara River

STATION LOCATION Missouri River at St. Joseph, Missouri

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	35.400	32.400	22.700	15.000	13.700	17.700	32.700	46.000	34.200	35.100	36.300	33.900
2	36.600	32.400	21.100	16.000	13.200	18.500	33.000	41.200	34.200	33.900	36.600	35.400
3	37.900	33.300	19.400	15.000	13.300	23.200	33.600	38.600	40.600	33.300	35.400	37.300
4	36.300	33.300	19.400	14.500	13.700	34.400	34.500	38.600	62.200	33.300	33.000	36.300
5	34.800	34.800	19.400	15.700	14.000	46.400	36.300	46.800	46.400	33.900	32.700	34.800
6	34.500	35.700	19.000	17.300	15.000	31.300	36.600	42.600	52.000	35.400	31.600	33.600
7	35.100	35.700	18.100	18.500	16.400	25.400	35.100	39.200	57.200	38.600	37.300	31.800
8	36.000	35.100	17.900	17.900	24.000	24.700	33.300	36.600	44.800	40.200	40.600	31.800
9	36.600	34.800	17.300	18.300	23.600	31.000	33.900	35.400	38.900	37.300	33.600	30.400
10	36.300	34.500	16.800	18.700	21.100	36.000	34.200	36.300	34.500	34.200	34.500	30.700
11	34.500	34.500	15.000	19.000	19.800	38.900	33.900	36.000	33.900	34.200	31.800	33.900
12	33.000	34.500	11.100	16.800	19.200	76.300	33.900	35.700	35.700	36.000	38.200	37.900
13	33.300	34.500	5.900	11.100	18.100	60.000	37.600	37.300	36.600	37.600	36.900	35.700
14	34.200	33.900	5.600	7.610	18.500	44.800	42.600	39.900	35.700	35.100	35.700	35.100
15	34.200	34.200	5.600	5.700	19.800	37.600	40.600	66.000	35.400	33.000	35.100	33.300
16	34.200	34.500	7.300	4.520	20.200	39.600	38.600	63.100	36.000	32.400	33.300	33.300
17	34.200	35.100	9.640	4.010	18.700	38.200	38.600	46.000	35.400	31.600	33.000	34.500
18	34.800	34.800	21.100	4.430	18.300	36.000	38.200	42.000	34.500	31.600	33.300	33.000
19	34.500	33.300	15.500	5.000	23.800	33.000	38.900	38.900	33.900	33.600	35.400	31.800
20	33.200	33.300	15.700	5.300	19.700	34.800	38.200	37.000	31.000	33.000	36.000	31.300
21	44.800	33.300	18.500	5.500	20.600	32.400	36.600	37.000	31.300	32.100	33.300	32.400
22	37.900	33.600	18.800	8.000	19.800	29.900	36.000	36.000	33.900	31.300	32.100	33.000
23	35.100	33.600	16.400	10.500	18.500	29.600	35.700	35.700	34.500	31.300	31.800	33.000
24	34.800	33.000	16.000	12.300	19.000	30.400	35.100	34.500	34.800	32.700	32.100	35.700
25	34.200	33.600	15.000	12.000	20.200	31.600	34.500	34.800	63.600	32.400	32.700	37.300
26	34.500	32.700	15.000	11.600	19.200	33.000	33.900	35.100	85.400	32.700	32.400	36.000
27	34.200	30.700	14.000	11.400	18.100	35.400	33.900	34.200	60.400	33.900	33.000	33.300
28	34.500	28.300	14.000	12.200	17.100	35.700	35.700	33.900	46.800	35.100	34.800	31.600
29	35.100	25.900	14.100	13.500		33.900	53.600	35.400	39.600	35.400	36.300	31.600
30	35.100	24.200	14.000	14.500		32.700	54.600	35.700	38.900	35.100	37.000	32.400
31	33.900		14.000	14.000		32.100		35.400		35.700	34.800	

MISSOURI RIVER AT OMAHA, NEBRASKA

This Water Pollution Surveillance System station is located about 130 miles below the confluence of the Big Sioux River and the Sioux City, Iowa municipal and industrial discharges. Samples are collected at the municipal water treatment plant intake. Sioux City discharges raw sewage and industrial wastes with a BOD population equivalent of about 500,000. A primary treatment plant now under construction will reduce this load.

736-498 O - 64 - 7

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Station Location: Missouri River at Omaha, Nebraska

Major Basin: Missouri River

Minor Basin: Lower Missouri below Niobrara River

Station at: 41°21' Latitude 95°58' Longitude

Miles above mouth: 626

Activation Date: October 26, 1947

Sampled by: Omaha Metropolitan Utilities District

Field Analysis by: Omaha Metropolitan Utilities District

Other Cooperating Agencies: Nebraska State Department of Health

Hydrologic Data:

Nearest pertinent gaging station: At Omaha, Nebraska

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 322,800 square miles

Period of record: 1928 to present

Average discharge in record period: 27,850 cfs.

Maximum discharge in record period: 396,000 cfs.

Minimum discharge in record period: about 2,200 cfs.

Remarks: Flows affected by reservoir operations.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
2-25-63	0.09
3-4-63	0.09
3-11-63	0.06
3-18-63	0.05
3-25-63	0.04
4-1-63	0.04
4-8-63	0.03
4-15-63	0.07
4-22-63	0.02
4-29-63	0.04
5-6-63	0.05
5-13-63	0.03
5-20-63	0.03
5-27-63	0.04
6-3-63	0.02
6-17-63	0.05
6-24-63	0.04
7-1-63	0.05
7-8-63	0.02
7-15-63	0.02
7-22-63	0.05
7-29-63	0.03
8-12-63	0.04
8-19-63	0.04
8-26-63	0.03
9-2-63	0.04
9-9-63	0.03
9-23-63	0.02
9-30-63	0.04

ELEMENTAL ANALYSES

		Composite Interval	
		10/1/62 to 12/31/62	4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.62	.71
	Na	63	66
	K	6.2	8.6
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	29	*5
	Cd	*5	*5
	As	*50	*50
	B	107	103
	P	*26	*27
	Fe	17	19
	Mo	31	*14
	Mn	*1	*5
	Al	-	11
	Be	*.13	*.14
	Cu	*3	*5
	Ag	*1	*1.4
	Ni	*3	*5
	Co	*10	*5
	Pb	*26	*14
	Cr	*3	*14
	V	*3	*27
	Ba	87	81
	Sr	313	238

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	2.5	.3	April to June	-	-
January to March	-	-	July to September	4.5	.4

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE NEBRASKA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI-BLACK-NIOBRARA RIVERS

STATION LOCATION MISSOURI RIVER AT OMAHA, NEBRASKA 31

DATE SAMPLE TAKEN			DATE OF DETERMINATION		RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANETON					
					ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO	DAY	YR	MO	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO	DAY	pc/g	±	pc/g	±
10	1	62	10	25	-	-	-	-	-	-	9	15	21	16	30	22						
10	8	62	11	2	-	-	-	-	-	-	19	17	30	16	49	24						
10	15	62	11	14	-	-	-	-	-	-	1	15	37	16	38	22						
10	22	62	11	19	1	2	1	2	2	3	56	7	31	9	87	9						
10	29	62	12	23	-	-	-	-	-	-	11	10	24	11	35	15						
11	26	62	12	21*	2	2	4	3	6	4	13	14	27	16	85	21						
12	31	62	1	21*	2	2	7	4	9	4	14	9	26	7	40	13						
1	28	63	2	19*	3	3	2	2	3	3	1	14	23	18	74	22						
2	25	63	3	22*	4	3	4	3	8	5	5	7	26	10	31	12						
3	25	63	4	15*	7	3	34	20	41	20	303	52	64	9	167	53						
4	29	63	5	17*	7	4	6	3	13	6	40	14	38	16	96	28						
5	27	63	6	17*	5	5	2	2	7	6	142	53	39	8	191	24						
6	24	63	7	22*	47	26	6	4	53	29	106	11	49	14	205	110						
7	31	63	8	19*	2	3	4	3	6	4	24	8	36	9	60	11						
8	26	63	9	22*	2	3	4	4	6	4	22	8	39	8	61	14						
9	30	63	10	22*	9	4	4	4	13	6	47	10	30	11	77	15						

PLANKTON POPULATION

STATE NEBRASKA
MAJOR BASIN MISSOURI RIVER
MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER
STATION LOCATION MISSOURI RIVER AT
OMAHA, NEBRASKA

031

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml)	MICROINVERTEBRATES																					
			1ST		2ND		3RD		4TH				PROTOZOA (Unidentified) (Number per ml)	ROTIFERS										CRUSTACEA							NEMATODES (Unidentified) (Number per liter)	OTHER ANIMAL FORMS (Number per liter)
														GENERA AND COUNT LEVEL (See text for Codes)										GENERA AND COUNT LEVEL (See text for Codes)								
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT			NUMBER PER LITER	1ST		2ND		3RD		4TH		5TH		NUMBER PER LITER	1ST		2ND		3RD			
															GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	1	62	36	23	65	21	92	14	64	5	37		-	0										0							0	0
10	18	62	61	47	80	33	58	5	82	3	12	20	-	0										0							0	0
11	5	62	80	65	32	14	36	5	83	3	13		-	0										1							0	0
11	20	62	80	48	26	11	82	9	36	5	27		-	0										0							0	0
12	3	62	82	80	80	6	26	3	71	3	8		-	0										0							0	0
12	17	62	82	79	80	6	26	3	71	2	10		-	0										0							0	0
1	7	63	82	53	80	25	9	5	71	2	15		-	0										3							0	0
1	21	63	9	65	82	23	80	7	26	1	4		-	0										0							0	0
2	4	63	9	53	82	22	80	21	71	1	3		-	0										2							0	0
2	18	63	9	70	82	17	80	9	70	1	3		-	0										1							0	0
3	4	63	9	66	80	20	82	12	71	1	1		-	0										0							0	0
3	18	63											-	-										-							-	-
4	1	63	9	46	82	23	36	3	46	3	25		-	1										2							0	0
4	15	63	9	56	80	27	82	11	71	3	3		-	0										4	76	1					0	0
5	6	63	9	41	82	33	82	17	35	2	7		-	15	17	1	11	1						2							0	0
5	20	63	9	60	82	16	80	18	26	1	3		-	0										0							0	0
6	17	63	9	42	47	30	80	9	58	4	15		-	0										0							0	0
7	1	63	80	64	56	16	26	9	27	3	8		-	1										1							0	0
7	15	63	80	63	82	11	58	8	26	7	11		-	-										-							-	-
8	5	63	80	36	56	28	26	16	56	7	11		-	0										0							0	0
8	19	63	26	32	58	29	80	18	82	4	17		-	0										0							0	0
9	2	63	56	66	58	10	82	7	26	7	10		-	0										0							0	0
9	16	63	58	40	82	14	26	5	70	5	36		-	0										0							0	0

PLANKTON POPULATION

STATE NEBRASKA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT OMAHA, NEBRASKA

31

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	5600	70	70	1090	320	610	0	3050	380	320	110	71	4	68	3	24	2	50	2	38	1	51	1	57	1	25	1				
10	18	62	3300	40	110	400	0	330	0	2120	290	400	130	69	4	71	2	51	1														
11	5	62	2100	20	50	200	0	20	0	1600	200	230	160	71	4	69	1																
11	20	62	2000	0	100	80	0	190	0	1330	290	80	40	71	3	68	2																
12	3	62	3400	0	70	160	0	160	590	2340	110	720	110	71	4	62	2																
12	17	62	1000	0	0	40	0	40	0	790	80	0	0	71	3																		
1	7	63	1100	0	0	20	0	90	0	880	90	130	40	71	3																		
1	21	63	400	0	0	0	0	20	0	220	110	0	0	71	1																		
2	4	63	400	0	0	0	0	0	0	200	200	0	0	71	1	77	1																
2	18	63	3100	0	80	60	0	130	270	1050	1510	110	130	77	4	71	3	65	1														
3	4	63	7800	0	40	0	0	440	380	3990	2930	900	530	71	5	77	5	51	2	65	1	88	1										
3	18	63	4800	0	0	110	0	110	240	1390	2990	90	900	77	4																		
4	1	63	5100	0	0	20	0	570	220	3170	1080	900	310	71	5	77	3	51	1	52	1	64	1										
4	15	63	9400	40	320	280	0	270	1260	3910	3300	710	650	71	5	77	5	63	4	88	2	17	2	51	1								
5	6	63	5900	0	20	330	0	240	20	1910	3320	900	200	77	5	71	4	88	1	97	1	38	1										
5	20	63	8300	0	190	1640	0	360	420	4580	1130	820	170	71	5	77	4	38	2	24	2	63	2	51	2	26	1						
6	17	63	700	0	20	90	0	0	0	200	420	130	240	77	1	84	1																
7	1	63	4200	0	0	250	0	20	0	3560	330	430	310	71	5	69	3	6	2														
7	15	63	4000	40	0	790	0	200	0	2420	530	1120	200	71	4	38	2	69	1	68	1												
8	5	63	3200	50	30	1130	30	50	0	1550	370	2120	620	71	3	38	3	68	2	25	1	88	1										
8	19	63	2200	0	0	790	0	410	0	600	350	410	210	38	2	55	2	68	1	87	1	71	1										
9	2	63	3000	40	0	1640	0	350	0	370	580	430	710	34	3	38	2	88	2	69	1	25	1	55	1								
9	16	63	1200	0	20	160	0	340	0	380	290	110	20	51	1	55	1																

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE NEBRASKA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT OMAHA, NEBRASKA

DATE OF SAMPLE BEGINNING MONTH	BEGINNING DAY	BEGINNING YEAR	END MONTH	END DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	EXTRACTABLES CHLOROFORM	EXTRACTABLES ALCOHOL	CHLOROFORM EXTRACTABLES ETHER INSOLUBLES	CHLOROFORM EXTRACTABLES WATER SOLUBLES	NEUTRALS TOTAL	NEUTRALS ALIPHATICS	NEUTRALS AROMATICS	NEUTRALS OXYGENATED COMPOUNDS	NEUTRALS LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	22	62	11	5	4640	127	19	108	0	5	8	1	1	6	0	2	1	1	2
11	19	62	12	3	4920	132	24	108	0	5	10	1	1	8	0	4	1	1	3
12	17	62	12	31	5040	164	23	141	0	6	10	1	1	8	0	3	1	0	3
1	14	63	1	28	4950	181	35	146	-	-	-	-	-	-	-	-	-	-	-
2	11	63	2	25	4928	148	32	116	1	9	10	0	1	8	1	4	2	1	5
3	11	63	3	25	4920	252	75	177	-	-	-	-	-	-	-	-	-	-	-
4	8	63	4	22	4800	98	26	72	1	7	10	2	1	7	0	3	1	1	3
5	6	63	5	20	3790	120	47	73	-	-	-	-	-	-	-	-	-	-	-
6	3	63	6	17	4077	120	48	72	3	15	11	1	1	9	0	5	5	1	8
7	1	63	7	15	4537	119	41	78	-	-	-	-	-	-	-	-	-	-	-
7	29	63	8	12	4652	103	34	69	1	13	10	1	1	8	0	4	2	2	2
8	26	63	9	9	4568#	121	32	89	-	-	-	-	-	-	-	-	-	-	-
9	23	63	10	7	4425	119	19	100	0	5	7	0	1	6	0	2	1	1	3

ESTIMATED

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE NEBRASKA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT OMAHA, NEBRASKA

31

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	15.0	8.3	8.2	1.0	18	2.5	6.8	.1	9	156	250	6	130	201	.1	515	10000
10	8	62	16.0	7.8	8.2	1.6	24	2.5	6.0	.0	12	152	252	11	210	212	.1	514	18000
10	15	62	19.1	7.8	8.2	1.9	17	3.2	6.5	.0	12	156	242	7	140	210	.2	508	10000
10	22	62	14.0	8.7	8.3	1.4	17	2.6	6.4	.0	11	156	256	8	140	220	.1	484	27000
10	29	62	10.1	9.5	8.2	1.2	21	2.6	7.0	.0	11	158	250	8	130	225	.1	498	40000
11	5	62	7.0	10.6	8.3	1.8	20	2.9	7.4	.0	10	154	252	7	130	222	-	542	*1100
11	12	62	6.8	10.6	8.3	1.2	16	2.6	6.8	.0	12	156	255	7	110	229	.1	528	60000
11	19	62	6.0	11.4	8.2	1.0	19	2.4	6.4	.0	11	157	260	9	100	236	-	541	10000
11	26	62	4.2	11.4	8.3	.9	17	2.6	6.4	.1	13	166	-	7	95	232	.1	557	50000
12	3	62	-	9.9	8.2	2.3	18	2.4	6.5	.0	14	196	310	7	110	220	.1	559	24000
12	10	62	.2	11.3	8.2	1.8	16	2.4	-	.1	14	203	320	7	100	245	.1	588	500
12	17	62	.2	11.8	8.1	2.1	54	3.1	5.0	.1	16	209	340	7	300	239	.1	581	-
12	24	62	.3	12.2	8.2	.9	18	2.5	6.0	.1	16	200	312	7	50	231	.1	599	-
12	31	62	.1	13.3	8.2	1.2	18	2.2	4.1	.1	15	190	312	7	10	227	.1	578	-
1	7	63	.1	12.2	8.2	2.1	14	2.5	5.8	.1	14	189	300	8	20	233	.1	562	7900
1	14	63	.1	12.5	8.1	1.0	17	2.5	3.9	.1	15	218	330	7	20	232	.1	582	100
1	21	63	.1	12.2	8.2	.7	18	2.4	4.5	.1	17	193	314	7	15	261	.1	630	4600
1	28	63	.1	12.1	8.1	1.1	15	2.4	5.8	.1	16	191	310	7	6	249	.1	596	6400
2	4	63	.1	11.2	8.1	1.2	12	2.8	5.9	.2	16	190	300	6	6	283	.1	595	7000
2	11	63	.1	10.0	8.1	1.5	20	3.3	6.8	.3	15	185	293	11	35	223	.1	549	-
2	18	63	.4	11.3	8.0	1.7	20	3.2	7.1	.2	18	202	326	7	50	241	.1	619	18000
2	25	63	.1	11.3	8.1	2.7	20	3.0	7.1	.2	16	202	310	9	35	205	.2	549	2200
3	4	63	.1	11.6	8.1	2.6	17	2.5	7.1	.2	15	198	305	8	55	207	-	530	11000
3	11	63	.1	10.1	8.0	7.2	54	3.1	7.0	.4	12	177	250	16	540	202	.2	432	63000
3	18	63	3.1	9.3	8.0	9.0	108	4.9	6.9	.5	12	180	250	21	1150	180	.2	411	10000
3	25	63	9.8	9.2	8.1	8.4	129	4.8	9.0	.2	11	174	240	11	1850	151	-	406	*110
4	1	63	11.5	9.6	8.1	3.2	24	3.0	6.8	.1	9	145	230	9	190	168	.1	412	-
4	2	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*110
4	8	63	12.8	9.1	8.2	1.9	26	2.4	-	.1	11	169	279	7	180	224	.1	544	-
4	15	63	11.6	9.3	8.3	1.5	22	2.1	4.8	.0	12	164	278	7	150	253	.0	580	-
4	22	63	10.4	9.6	8.3	1.8	21	2.1	5.1	.0	12	163	282	7	130	249	.0	573	29000
4	29	63	12.1	9.2	8.3	1.7	33	3.0	6.5	.0	13	172	290	7	300	250	.1	575	9000
5	6	63	15.7	8.7	8.3	2.0	27	2.9	6.8	.0	13	169	292	6	260	241	.1	577	300
5	13	63	15.0	8.0	8.1	5.1	59	3.0	6.5	.1	15	181	274	7	1400	243	.1	552	-
5	20	63	16.4	8.7	8.3	2.1	23	2.3	5.5	.0	13	170	290	8	110	254	.1	609	5000
5	27	63	16.3	8.3	8.3	1.5	16	2.2	-	.0	13	170	280	6	100	226	.1	583	4000
6	3	63	19.8	4.7	7.7	4.0	198	4.9	9.1	.1	8	124	190	13	4300	146	.1	332	100000
6	10	63	25.0	6.7	8.1	2.5	32	2.7	7.1	.0	14	174	275	8	290	234	.1	553	-
6	17	63	22.8	6.4	8.1	.8	19	2.0	4.9	.0	13	164	260	8	160	231	.1	498	14000

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE NEBRASKA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT OMAHA, NEBRASKA

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
6	24	63	22.2	7.6	8.3	1.6	23	2.2	6.5	.0	12	170	265	7	140	229	.1	557	22000
7	1	63	27.0	6.6	8.2	1.7	22	2.6	7.0	.0	11	168	257	7	180	238	.3	521	-
7	8	63	26.1	6.8	8.1	1.7	28	2.8	5.8	.0	12	170	250	8	310	235	.1	541	16000
7	15	63	24.0	6.5	8.1	1.0	20	2.8	6.7	.1	12	166	260	8	190	229	.1	566	11000
7	22	63	27.1	6.0	8.2	1.0	22	3.0	13.0	.0	12	165	255	7	160	230	.1	542	700
7	29	63	25.7	6.2	8.2	.8	20	4.0	10.2	.0	13	165	256	6	150	241	.1	569	-
8	5	63	25.0	6.5	8.2	1.4	19	4.0	10.0	.0	13	160	250	7	160	234	.1	549	2300
8	12	63	26.8	6.0	8.2	1.0	18	1.4	-	.0	13	158	246	7	140	227	.1	510	12000
8	19	63	21.9	7.0	8.2	1.1	19	2.0	12.0	.0	12	161	258	6	110	226	-	506	4500
8	26	63	24.1	7.0	8.3	1.8	23	2.0	6.0	.0	11	163	250	7	120	232	.1	527	18000
9	2	63	22.4	7.0	8.2	1.2	18	1.5	5.8	.0	12	158	242	7	140	225	.1	527	10000
9	9	63	24.0	7.0	8.3	1.0	14	2.3	6.0	.0	14	159	245	7	95	227	.2	524	33000
9	16	63	19.5	7.5	8.3	1.0	13	2.0	5.0	.0	12	157	245	5	110	214	.1	517	3800
9	23	63	19.1	7.5	8.3	1.0	15	1.9	4.9	.0	12	157	246	5	170	233	.1	517	6700
9	30	63	18.4	7.4	8.3	1.2	15	2.1	5.4	.0	13	160	244	6	120	-	.1	530	30000

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Omaha, Nebraska
Operated by U.S. Geological Survey

STATE Nebraska

MAJOR BASIN Missouri River

MINOR BASIN Lower Missouri below Niobrara River

STATION LOCATION Missouri River at Omaha, Nebraska

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	27.700	27.400	11.400	11.400	7.900	6.900	23.200	27.400	28.200	27.700	32.600	32.400
2	28.000	27.200	10.700	9.950	7.900	6.760	23.700	26.000	38.700	28.200	31.200	33.200
3	28.000	27.200	10.700	11.200	8.200	7.200	24.700	26.400	57.400	29.200	30.700	32.600
4	27.000	27.700	11.000	11.400	8.600	8.100	25.400	27.000	41.400	29.700	29.700	32.100
5	26.400	27.700	9.950	11.600	8.800	7.900	25.000	28.200	49.900	30.000	29.000	30.000
6	27.000	27.700	9.450	11.600	8.900	7.050	24.000	28.200	50.300	31.500	38.900	29.000
7	27.700	28.200	9.700	11.700	9.000	7.380	23.200	27.200	37.000	32.900	32.400	29.000
8	28.400	28.700	10.200	11.200	9.000	7.720	24.400	27.000	30.200	31.200	30.400	28.700
9	28.000	28.200	9.700	11.700	8.100	8.500	26.000	27.700	27.000	29.700	30.000	28.700
10	27.400	28.000	9.450	11.500	7.900	10.400	25.200	27.700	26.700	30.200	30.400	29.200
11	27.200	27.700	6.000	10.000	7.800	14.500	25.200	27.700	28.000	30.000	30.700	29.400
12	27.400	27.400	3.400	9.000	7.700	14.700	28.000	29.200	29.200	29.400	30.700	29.400
13	28.000	27.000	3.300	8.000	7.600	13.000	30.200	32.900	29.400	29.000	30.700	28.700
14	27.400	26.700	4.200	7.000	7.800	11.000	29.400	30.200	30.200	29.200	30.700	27.700
15	27.000	26.700	5.000	8.000	7.900	13.700	29.200	27.200	30.000	29.700	30.200	27.400
16	27.200	27.000	6.400	9.000	8.300	15.000	29.000	27.000	30.400	30.000	30.000	27.700
17	27.000	27.000	14.500	9.200	8.500	14.200	29.200	28.200	31.000	31.500	30.000	27.700
18	27.000	26.700	12.200	9.500	8.100	12.200	28.700	27.700	28.700	31.800	30.200	27.700
19	27.200	26.700	13.400	9.000	8.500	13.200	28.200	28.000	26.400	31.200	30.200	28.200
20	27.700	26.700	13.700	8.500	8.950	13.200	27.700	29.200	26.400	31.200	30.200	29.400
21	27.700	27.400	12.200	8.500	9.200	15.000	27.000	29.000	28.200	31.000	29.700	30.200
22	28.200	27.400	11.700	9.000	8.950	16.700	27.200	28.700	27.700	31.000	30.400	30.400
23	28.200	27.200	11.000	9.200	8.100	18.700	27.400	28.200	28.400	31.500	30.400	31.000
24	28.200	27.200	10.400	9.400	7.380	19.000	27.700	28.400	28.400	31.800	30.400	30.400
25	28.000	25.700	9.450	9.400	6.630	21.000	27.000	28.400	28.400	32.400	30.400	29.700
26	27.400	23.000	9.700	9.400	7.550	24.000	27.400	28.400	29.000	32.600	30.700	27.700
27	27.400	20.200	10.200	9.400	7.900	25.200	28.200	29.400	25.400	32.100	31.800	27.000
28	27.700	17.700	11.500	9.400	7.380	25.200	28.700	29.400	24.200	31.800	33.400	28.000
29	27.700	15.700	11.200	9.400		24.000	29.000	29.200	25.700	31.800	34.000	28.000
30	27.400	13.400	11.800	9.000		23.700	28.200	28.700	26.400	31.800	32.100	27.700
31	27.400		12.000	8.000		23.000		27.700		31.500	31.800	

MISSOURI RIVER AT YANKTON, SOUTH DAKOTA

The Yankton, South Dakota Water Pollution Surveillance System station is located about 7 miles below Gavin's Point Dam which is the last of a series of dams on the main stem. Samples are collected at the municipal water treatment plant intake. The Niobrara River and White River are tributary to the main stem in Lewis and Clark Lake above Gavin's Point Dam.

Plankton populations were of considerable interest following reports of severe taste and odor problems in June. Total plankton counts rose to a peak of over 40,000 per milliliter on April 22, and then declined to a level of approximately 6,000 in May and June. The diatoms Asterionella and Stephanodiscus were usually dominant and represented from 20% to 90% of the algae during this period. Both of these diatoms are known to produce taste and odors and there is a possibility that their decomposition may be a prime cause of the taste and odor problem.

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Station Location: Missouri River at Yankton, South Dakota

Major Basin: Missouri River

Minor Basin: Lower Missouri below Niobrara River

Station at: 42°51' Latitude 97°30' Longitude

Miles above mouth: 805

Activation Date: October 28, 1957

Sampled by: Yankton Water Department

Field Analysis by: Yankton water Department

Other Cooperating Agencies: South Dakota State Board of Health

Hydrologic Data:

Nearest pertinent gaging station: At Yankton, South Dakota

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 279,500 square miles

Period of record: 1930 to present

Average discharge in record period: 24,700 cfs.

Maximum discharge in record period: 480,000 cfs.

Minimum discharge in record period: 2,700 cfs.

Remarks: Flows completely regulated by operations of Gavin's Point Dam, 6 miles upstream. Many irrigation diversions above station.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l
7-1-63	0.03
7-8-63	0.02
7-15-63	0.03
7-22-63	0.04
8-5-63	0.07
8-12-63	0.03
8-19-63	0.06
8-26-63	<0.02
9-3-63	0.04
9-9-63	0.05
9-23-63	0.03

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame metnods. Results in mg/l	F	.62	.80
	Na	64	73
	K	6.9	8.6
Analysis by Spectro-graphic metnods. Results in micrograms per liter	Zn	22	11
	Cd	*4	*11
	As	*41	*40
	B	98	168
	P	*20	*28
	Fe	61	20
	Mo	76	*14
	Mn	1.6	*5.6
	Al	–	*11
	Be	*.1	*.14
	Cu	8	25
	Ag	.8	*1.4
	Ni	*5	*6
	Co	*8	*6
	Pb	*20	*14
	Cr	*2	*14
	V	*4	*28
	Ba	43	53
	Sr	343	336

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	2.3	.1	April to June	3.3	.3
January to March	–	–	July to September	–	–

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE SOUTH DAKOTA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT YANKTON, SOUTH DAKOTA

32

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON				
			DATE OF DETERMINATION	ALPHA					BETA						DATE OF DETERMINATION	GROSS ACTIVITY			
				SUSPENDED		DISSOLVED		TOTAL	SUSPENDED		DISSOLVED		TOTAL			ALPHA		BETA	
MO	DAY	YR	MO DAY	pc/l	±	pc/l	±	pc/l ±	pc/l	±	pc/l	±	pc/l	±	MO DAY	pc/g	±	pc/g	±
10	22	62	11 16	0	1	11	6	11 6	12	11	71	21	83	24					
10	29	62	11 21	-	-	-	-	- -	3	12	39	20	42	23					
11	19	62	12 14*	0	1	4	3	4 3	3	11	50	17	53	20					
12	31	62	1 16*	0	1	9	3	9 3	6	13	21	18	27	22					
1	28	63	2 19*	1	1	12	5	13 5	8	13	28	16	36	22					
2	25	63	3 19*	5	3	6	3	11 4	25	16	10	16	35	24					
3	25	63	4 15*	0	1	3	3	3 3	3	6	70	8	79	10					
4	29	63	5 17*	0	2	5	3	7 4	25	15	34	16	59	20					
5	27	63	6 17*	0	1	6	4	6 4	9	6	37	8	45	10					
6	24	63	7 23*	0	2	2	4	2 4	1	5	42	14	43	15					
7	29	63	8 16*	0	1	4	3	4 3	7	6	35	17	42	18					
8	26	63	9 25*	0	0	3	3	3 3	9	0	41	16	50	17					
9	23	63	10 23*	0	0	3	3	3 3	0	18	33	16	33	24					

PLANKTON POPULATION

STATE SOUTH DAKOTA
MAJOR BASIN MISSOURI RIVER
MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER
STATION LOCATION MISSOURI RIVER AT
YANKTON, SOUTH DAKOTA 032

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml)	MICROINVERTEBRATES																			
			1ST		2ND		3RD		4TH		OTHER SPECIES PERCENT		PROTOZOA (Identifiable) (Number per ml)	ROTIFERS										CRUSTACEA							NEMATODES (Identifiable) (Number per liter)	OTHER ANIMAL FORMS (Number per liter)
															GENERA AND COUNT LEVEL (See text for Codes)										GENERA AND COUNT LEVEL (See text for Codes)							
														NUMBER PER LITER	1ST		2ND		3RD		4TH		5TH		NUMBER PER LITER	1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT					GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	1	62	80	58	83	9	36	8	58	8	17			0																	0	1
10	15	62	80	71	83	7	33	3	92	3	16														3	51	1				0	1
11	5	62	80	83	36	5	83	2	16	2	8			16	15	1	3	1							2						2	0
11	19	62	80	60	36	11	83	7	71	5	17			3											0						0	0
12	3	62	80	48	36	11	62	7	71	6	28	50													1						0	1
12	17	62	82	65	80	20	26	2	64	2	11			1											0						0	0
1	7	63	80	85	82	21	9	12	92	1	1			0											4						0	0
1	17	63	80	80	9	8	36	8	32	1	3			0											0						0	0
2	4	63	80	76	9	8	36	8	82	2	5			1											1						0	0
2	18	63	36	41	80	26	9	9	51	7	17			0											3	76	1				0	0
3	4	63												-											-						-	-
3	18	63	36	54	80	38	71	3	62	2	3			114	17	5	21	2	11	1	7	1			39	50	4	76	2	51	1	9	0
4	1	63	80	72	36	15	9	4	62	2	7			106	14	4	17	2	11	2	9	1			10	50	2					0	0
4	22	63												-											-							-
5	6	63												-											-							-
5	20	62												-											-							-
6	3	63	9	93	80	5	47	1			1			7											-							-
6	13	63	9	69	82	11	47	8	80	4	8			183	17	5	11	4	21	1					603	76	5	77	5	50	1	0	0
6	17	63	9	85	80	8	47	4	36	1	2			21	11	2									53	76	4	50	3	77	3	0	0
7	1	63	80	42	27	22	9	22	56	3	11			125	11	5	2	3	21	1					15	76	3					0	0
7	2	63	80	34	81	25	58	14	82	8	18			240	11	5	17	4	2	3	22	2	18	1	89	50	5	76	5			0	0
7	15	63	58	35	80	29	82	16	26	5	15			2											76	50	5					1	0
8	5	63												-											1							0
8	18	63																							-							0
9	3	63												657	17	7	21	5	22	5	2	4	15	3	1							0	0
9	16	63												-											-							-

PLANKTON POPULATION

STATE SOUTH DAKOTA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT

YANKTON, SOUTH DAKOTA 32

DATE OF SAMPLE			ALGAE (Number per milliliter)								INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS			1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	17600	0	230	250	0	0	0	6120	10970	5910	2950	71	6	82	5	81	5	88	4	83	3	92	3	87	3	38	1	97	1	17	1
10	15	62	900	0	0	40	0	230	60	250	330	120	40																				
11	5	62	1200	0	0	0	0	0	0	830	340	340	340	71	3	82	1																
11	19	62	2100	0	0	20	0	270	40	1120	660	170	80	71	3	82	1	69	1	57	1												
12	3	62	5400	0	0	0	0	0	160	1490	3710	1550	1600	71	4	82	3	88	3	79	2	92	1	87	1	85	1	62	1				
12	17	62	100	0	0	0	0	30	0	80	20	50	30																				
1	7	63	1500	0	0	0	0	330	20	1140	0	70	0	71	3	65	1																
1	17	63	2100	0	0	0	0	220	0	1470	400	330	110	71	4	65	1	77	1	82	1												
2	4	63	2900	0	60	40	0	0	250	1710	800	500	80	71	4	77	2	65	1														
2	18	63	11800	0	20	40	0	350	1300	6710	2880	660	70	71	6	77	4	62	4	82	2	51	1	65	1								
3	4	63	25800	0	170	40	0	420	*	7560	3110	2980	670	65	7	77	5	51	2	60	1												
3	18	63	26300	0	250	80	0	1260	*	2730	11970	8190	550	63	6	77	6	71	5	82	5	51	4	62	2	17	1						
4	1	63	9100	0	0	0	0	1970	130	6130	840	760	550	71	6	65	4	82	3														
4	22	63	40800	0	130	40	0	170	*	11510	12310	3070	2140	65	7	77	6	60	1														
5	6	63	14500	0	0	0	0	0	0	4490	10000	1220	630	77	6																		
5	20	63	6000	0	0	90	0	260	2270	2270	1120	860	620	65	4	77	3	51	1														
6	3	63	1100	0	0	40	0	0	0	130	920	0	90	77	3																		
6	13	63	1100	0	40	130	0	40	250	230	420	130	20	77	1	63	1	71	1														
6	17	63	6400	0	20	20	0	0	40	170	6110	130	110	77	6																		
7	1	63	300	0	0	70	0	90	20	90	20	20	20																				
7	2	63	1300	20	0	90	0	300	0	700	200	110	110	71	3	55	1																
7	15	63	500	0	0	170	0	0	20	270	0	80	40																				
8	5	63	6900	0	0	170	0	3680	0	2660	210	710	270	55	5	69	3																
8	18	63	1200	50	0	790	0	80	0	220	50	340	200	38	2																		
9	3	63	3700	20	20	1030	0	730	0	1140	730	2860	1550	38	2	69	2	25	1														
9	16	63	5000	0	0	110	0	3300	0	1240	380	450	500	55	5	69	1																
3	4	63							* 14530																								
3	18	63							* 10000																								
4	22	63							* 16630																								

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE SOUTH DAKOTA
MAJOR BASIN MISSOURI RIVER
MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER
STATION LOCATION MISSOURI RIVER AT
YANKTON, SOUTH DAKOTA 32

DATE OF SAMPLE BEGINNING			DATE OF SAMPLE END		GALLONS FILTERED	EXTRACTABLES			CHLOROFORM EXTRACTABLES										
											NEUTRALS								
MONTH	DAY	YEAR	MONTH	DAY		TOTAL	CHLORO-FORM	ALCOHOL	ETHER INSOLUBLES	WATER SOLUBLES	TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	22	62	10	31	4030	123	34	89	-	-	-	-	-	-	-	-	-	-	-
11	19	62	12	3	5000	133	63	70	-	-	-	-	-	-	-	-	-	-	-
11	19	62		*	9430	130	51	79	3	15	10	1	1	8	0	5	5	1	12
12	31	62	1	13	2800	247	37	210	2	11	10	1	0	9	0	5	2	1	6
1	28	63	2	11	3460	193	49	144	-	-	-	-	-	-	-	-	-	-	-
2	25	63	3	11	2110	272	58	214	1	17	16	1	1	12	2	5	4	2	13
3	25	63	4	8	3980	118	34	84	-	-	-	-	-	-	-	-	-	-	-
4	22	63	5	6	1890	192	24	168	-	-	-	-	-	-	-	-	-	-	-
4	22	63		*	9670	142	31	111	1	10	10	1	1	7	1	3	2	1	4
5	20	63	5	28	1390	311	85	226	-	-	-	-	-	-	-	-	-	-	-
6	17	63	6	29	1280	399	112	287	9	31	30	1	2	25	2	14	8	1	19
7	22	63	8	5	4070	136	47	89	-	-	-	-	-	-	-	-	-	-	-
8	18	63	8	31	4070	105	30	75	0	9	10	0	1	8	1	3	2	1	5
9	23	63	10	7	3510	125	31	94	-	-	-	-	-	-	-	-	-	-	-

CHEMICAL. PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE SOUTH DAKOTA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION MISSOURI RIVER AT YANKTON, SOUTH DAKOTA

32

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	16.5	-	8.2	3.1	-	.7	3.8	.2	20	146	232	5	20	-	.1	-	600
10	8	62	15.8	-	8.1	2.1	-	.7	4.1	.2	22	148	240	10	20	-	.1	-	14000
10	15	62	18.2	-	8.2	5.2	-	.5	3.8	.1	21	138	234	10	20	-	.1	-	*100
10	22	62	14.8	-	8.2	4.1	-	.5	3.6	.1	18	144	238	10	25	-	.1	-	200
10	29	62	11.0	-	8.2	.8	-	.8	2.8	.2	20	142	248	10	20	-	.1	-	*100
11	5	62	9.9	-	8.2	.6	-	1.1	4.1	.1	17	144	248	5	20	-	.1	-	*100
11	13	62	7.2	-	8.1	4.8	-	.5	3.6	.1	22	148	256	5	20	-	.1	-	*100
11	19	62	6.8	-	8.1	3.8	-	.5	3.2	.2	20	150	256	10	15	-	.1	-	*100
11	26	62	5.5	-	8.2	2.5	-	.8	1.5	.1	21	154	268	10	20	-	.1	-	100
12	3	62	7.2	-	8.2	1.7	-	.6	2.9	.2	22	152	270	5	25	-	.1	-	*100
12	10	62	3.1	-	8.1	1.9	-	.3	1.9	.2	20	164	280	10	20	-	.1	-	-
12	17	62	1.5	-	8.1	1.4	-	.9	2.2	.1	22	158	272	5	20	-	.1	-	*100
12	24	62	1.7	-	8.1	.9	-	.5	1.9	.1	20	162	270	5	20	-	.1	-	-
12	31	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1	1	63	1.8	-	8.1	1.1	-	.4	1.1	.2	17	162	272	5	20	-	.1	-	100
1	7	63	.1	-	8.1	.9	-	.7	2.1	.1	25	168	272	5	20	-	.1	-	-
1	14	63	.1	-	8.1	.9	-	.6	1.0	.2	22	170	278	5	20	-	.1	-	100
1	21	63	.3	-	8.2	.7	-	.7	1.4	.2	21	172	276	10	30	-	.1	-	*100
1	28	63	2.9	-	8.2	1.2	-	1.5	2.0	.2	29	170	292	5	15	-	.1	-	*100
2	4	63	2.0	-	8.1	.9	-	.2	2.3	.2	24	174	292	10	30	-	.1	-	*100
2	11	63	3.0	-	8.3	1.8	-	.4	1.9	.2	22	178	286	10	25	-	.1	-	*100
2	18	63	3.8	-	8.2	.9	-	1.4	3.9	.2	22	180	288	20	40	-	.1	-	-
2	25	63	4.0	-	8.1	2.0	-	1.4	3.1	.2	24	172	270	10	60	-	.1	-	*100
3	4	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5000
3	5	63	2.8	-	8.2	1.9	-	1.1	3.2	.2	22	158	266	10	25	-	.1	-	100
3	11	63	3.1	-	8.1	2.1	-	.9	2.8	.2	26	156	256	30	20	-	.1	-	-
3	18	63	3.2	-	8.3	3.3	-	1.4	3.9	.2	21	150	234	10	30	-	.1	-	*100
3	25	63	3.3	-	8.4	2.9	-	2.0	4.2	.2	24	130	198	10	30	-	.1	-	*100
4	1	63	9.5	-	8.0	3.1	-	1.7	4.8	.2	22	148	230	10	25	-	.1	-	*100
4	8	63	11.1	-	8.3	3.6	-	1.8	4.1	.2	24	164	268	10	25	-	.1	-	100
4	15	63	9.4	-	8.0	2.7	-	1.2	3.4	.2	24	154	278	10	30	-	.1	-	100
4	22	63	10.0	-	8.3	2.2	-	1.7	4.2	.2	24	166	280	10	25	-	.1	-	*100
4	29	63	10.0	-	8.2	1.0	-	1.9	3.0	.2	22	168	286	15	30	-	.1	-	*100
5	6	63	13.9	-	8.3	.5	-	2.2	5.1	.2	22	162	284	10	30	-	.1	-	*100
5	13	63	14.9	-	8.3	1.1	-	.8	3.9	.3	25	162	282	10	30	-	.1	-	-
5	20	63	15.4	-	8.2	1.2	-	.5	3.9	.1	24	-	274	5	25	-	.1	-	-
5	27	63	14.8	-	8.2	.9	-	1.7	3.5	.1	24	160	280	5	20	-	.0	-	*100

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE SOUTH DAKOTA
MAJOR BASIN MISSOURI RIVER
MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER
STATION LOCATION MISSOURI RIVER AT YANKTON, SOUTH DAKOTA

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
6	3	63	19.0	–	8.3	1.4	–	1.3	4.9	.1	24	160	264	5	20	–	.0	–	*100
6	10	63	22.9	–	8.2	1.8	–	2.9	4.8	.2	26	148	250	5	20	–	.1	–	*12
6	17	63	21.4	–	8.1	2.6	–	3.1	4.9	.3	20	158	260	5	25	–	.0	–	–
6	24	63	21.0	–	8.2	3.2	–	2.6	5.1	.2	25	166	270	5	25	–	.1	–	100
7	1	63	25.2	7.8	8.1	2.9	–	1.0	4.9	.3	18	160	260	5	30	–	.1	–	200
7	8	63	24.0	7.2	8.3	.6	–	.9	4.1	.3	22	160	266	5	30	–	.1	–	200
7	15	63	23.0	7.6	8.2	1.0	–	1.0	4.6	.2	20	158	258	5	25	–	.1	–	100
7	22	63	26.4	7.5	8.3	1.9	–	1.0	3.3	.2	27	156	250	10	30	–	.1	–	10
7	29	63	26.0	7.3	8.2	2.2	–	.8	3.9	.2	21	160	250	15	20	–	.1	–	80
8	5	63	24.5	7.5	7.9	1.0	–	1.0	4.2	.3	21	148	258	20	25	–	.0	–	60
8	12	63	25.0	8.0	8.3	2.0	–	2.1	4.0	.2	24	152	240	15	40	–	.1	–	*7
8	19	63	22.6	8.8	8.3	1.1	–	1.0	2.8	.2	20	158	258	20	30	–	.0	–	50
8	26	63	24.0	8.3	8.3	.8	–	1.0	3.3	.2	27	154	246	30	30	–	.0	–	–
9	3	63	22.0	9.3	8.2	.9	–	.8	2.4	.2	22	160	242	20	30	–	.1	–	–
9	9	63	22.8	10.8	8.4	1.1	–	1.3	3.0	.1	24	150	238	20	30	–	.0	–	200
9	16	63	21.5	9.2	8.3	1.8	–	.6	2.0	.1	20	154	248	10	20	–	.1	–	80
9	23	63	19.8	9.6	8.2	1.3	–	.5	2.0	.2	20	150	246	20	20	–	.1	–	50

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Yankton, South Dakota
Operated by U.S. Geological Survey

STATE: South Dakota

MAJOR BASIN: Missouri River

MINOR BASIN: Lower Missouri below Niobrara River

STATION LOCATION: Missouri River at Yankton, South Dakota

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	25.500	26.400	8.390	8.820	7.000	5.190	21.500	26.700	27.300	29.500	29.100	30.700
2	24.400	25.800	7.320	8.860	6.100	5.150	22.500	25.400	22.500	28.900	28.200	29.000
3	24.700	26.300	7.010	8.620	5.260	4.970	22.700	24.800	21.400	30.000	28.500	28.000
4	25.300	26.800	7.090	8.700	5.340	4.970	23.600	24.500	24.900	30.700	27.800	28.200
5	25.300	27.300	7.200	8.620	5.110	4.790	23.900	24.600	23.200	29.700	28.100	28.000
6	25.900	27.000	7.200	8.510	5.740	4.720	24.600	25.800	22.200	28.300	27.300	27.800
7	25.700	26.800	7.090	8.470	5.850	4.640	24.400	25.200	24.600	29.600	27.200	28.400
8	24.600	27.100	6.710	8.620	5.740	4.500	24.500	25.800	25.600	29.000	27.400	28.600
9	24.800	26.800	6.600	8.660	6.080	4.540	25.700	26.400	26.700	29.400	28.700	29.100
10	26.200	26.700	7.280	8.660	5.930	4.680	29.800	26.300	26.900	28.800	29.200	28.500
11	25.800	26.500	9.370	8.600	5.960	4.790	29.600	26.800	26.800	28.800	29.100	26.700
12	25.200	26.100	11.100	8.400	5.850	4.970	29.300	25.200	27.300	28.800	28.800	27.000
13	25.200	25.900	9.050	8.500	5.340	5.220	29.600	25.000	25.600	28.500	30.800	26.900
14	25.000	25.400	8.550	8.600	5.260	5.040	28.800	26.300	26.300	28.400	29.300	27.600
15	24.900	25.400	8.820	8.600	5.220	4.790	28.800	25.900	26.200	29.100	28.800	27.900
16	25.400	25.400	9.210	8.700	5.220	4.900	27.900	25.200	24.000	29.400	29.000	27.900
17	25.500	25.700	8.350	8.600	5.260	4.720	26.400	25.900	24.400	29.200	28.700	28.800
18	25.200	26.300	7.580	8.400	5.520	7.770	26.400	26.600	26.100	29.000	28.700	28.400
19	25.700	26.600	7.390	8.400	5.480	10.800	26.200	26.700	26.700	29.800	29.300	28.000
20	25.700	26.200	7.360	8.400	5.340	13.600	26.600	27.600	26.800	30.600	29.400	28.000
21	25.200	25.700	9.030	8.300	5.190	14.400	26.500	27.700	25.400	31.000	29.400	27.900
22	25.400	25.900	10.400	8.400	5.080	15.100	27.200	27.600	25.100	31.100	29.800	28.100
23	25.100	22.700	10.700	8.400	4.900	18.400	26.600	26.800	26.200	31.100	30.100	26.400
24	25.400	19.700	10.100	8.300	4.900	21.000	26.400	27.800	22.500	30.900	30.200	26.100
25	25.700	16.300	10.000	6.800	4.860	20.800	26.100	27.500	21.700	31.300	30.300	27.000
26	25.700	14.000	10.400	6.800	5.040	20.000	25.500	27.300	23.000	32.200	30.600	27.500
27	25.500	10.600	11.000	6.900	4.860	20.500	25.900	27.300	25.400	31.300	29.600	27.600
28	25.000	7.960	8.780	7.000	4.930	20.800	25.600	27.200	26.800	30.700	28.400	27.800
29	25.200	7.930	8.470	7.000		20.400	24.600	26.100	26.800	31.400	29.600	27.700
30	25.700	8.350	8.310	6.900		21.300	24.600	26.800	28.100	31.400	31.100	28.200
31	26.100		8.350	7.000		21.400		27.300		30.400	30.300	

MISSOURI RIVER AT BISMARCK, NORTH DAKOTA

This Water Pollution Surveillance System station is located about 70 miles below Garrison Dam in central North Dakota. Samples are collected at the municipal water treatment plant intake.

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Station Location: Missouri River at Bismarck, North Dakota

Major Basin: Missouri River

Minor Basin: Missouri-Souris Rivers

Station at: 46°49' Latitude 100°49' Longitude

Miles above mouth: 1314

Activation Date: November 7, 1957

Sampled by: Bismarck Water Department

Field Analysis by: Bismarck Water Department
North Dakota State Department of Health

Other Cooperating Agencies: None

Hydrologic Data:

Nearest pertinent gaging station: At Bismarck, North Dakota

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 186,400 square miles

Period of record: 1928 to present

Average discharge in record period: 20,620 cfs.

Maximum discharge in record period: 500,000 cfs.

Minimum discharge in record period: 1,800 cfs.

Remarks: Flow regulated at Garrison Reservoir. Many diversions from tributaries above gaging station.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.65	.70
	Na	53	62
	K	5.0	5.9
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	17	9
	Cd	*4	*5
	As	*45	*45
	B	91	158
	P	*22	*23
	Fe	48	*9
	Mo	35	16
	Mn	1.3	*4.5
	Al	–	*9
	Be	*.11	*.12
	Cu	25	43
	Ag	*.9	*1.2
	Ni	*2	*5
	Co	*9	*5
	Pb	*22	*12
	Cr	*2	*12
	V	*4	*23
	Ba	63	50
	Sr	267	257

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	1.7	.3	April to June	–	–
January to March	–	–	July to September	3.5	.4

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE NORTH DAKOTA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN MISSOURI-SOURIS RIVERS

STATION LOCATION MISSOURI RIVER AT BISMARCK, NORTH DAKOTA 33

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON				
			DATE OF DETERMINATION	ALPHA					BETA						DATE OF DETERMINATION	GROSS ACTIVITY			
				SUSPENDED		DISSOLVED		TOTAL	SUSPENDED		DISSOLVED		TOTAL			ALPHA		BETA	
MO.	DAY	YR	MO. DAY	pc/l	±	pc/l	±	pc/l ±	pc/l	±	pc/l	±	pc/l	±	MO. DAY	pc/g	±	pc/g	±
10	2	62	11 21	0	1	3	2	3 2	13	10	44	14	57	17					
10	9	62	11 30	-	-	-	-	- -	0	15	24	15	24	21					
10	16	62	11 9	-	-	-	-	- -	11	11	21	15	32	19					
10	23	62	11 16	-	-	-	-	- -	12	11	28	15	40	19					
10	30	62	11 26	-	-	-	-	- -	32	9	54	12	76	15					
11	27	62	12 15*	1	1	4	3	5 3	2	9	18	14	20	17					
12	18	62	1 23*	0	1	3	2	3 2	0	31	16	16	16	35					
1	29	63	2 20*	0	1	0	2	0 2	2	15	13	16	15	22					
2	26	63	3 11*	0	1	2	2	2 2	0	22	15	12	15	25					
3	26	63	4 15*	0	1	3	3	3 3	14	6	30	7	44	9					
4	30	63	5 22*	0	1	6	4	6 4	15	7	28	17	43	18					
5	28	63	6 17*	0	1	1	3	1 3	14	6	34	8	48	10					
6	25	63	7 23*	0	1	1	4	1 4	9	5	35	15	44	16					
7	30	63	8 16*	0	0	3	3	3 3	3	6	34	16	37	17					
8	27	63	9 25*	0	1	4	3	4 3	17	7	41	15	58	17					
9	24	63	10 23*	0	0	4	3	4 3	7	6	23	16	30	17					

PLANKTON POPULATION

STATE	NORTH DAKOTA
MAJOR BASIN	MISSOURI RIVER
MINOR BASIN	MISSOURI-SOURIS RIVERS
STATION LOCATION	MISSOURI RIVER AT BISMARCK, NORTH DAKOTA

033

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	PROTOZOA (Identifiable) Number per ml.	MICROINVERTEBRATES – ROTIFERS											MICROINVERTEBRATES – CRUSTACEA							NEMATODES (Identifiable) Number per liter	OTHER ANIMAL FORMS (Number per liter)
			1ST		2ND		3RD		4TH					NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD		4TH		5TH		NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	2	62	81	16	9	12	82	10	80	10	52	-	-	0											3	50	1					0	0
10	16	62	9	24	80	20	82	11	36	10	35	-	-	3											3	77	1					0	0
11	7	62	9	43	36	20	80	12	65	4	21	160	-	0											0							0	0
11	20	62	9	54	36	34	65	3	83	1	8	-	-	0											0							0	0
12	4	62	9	67	36	14	83	5	80	1	13	20	-	0											1							0	0
12	11	62	9	84	36	5	83	3	64	1	7	-	-	0											0							0	0
1	9	63	9	73	82	6	36	3	95	2	16	-	-	0											0							0	0
1	22	63	9	70	82	7	36	6	80	4	13	-	-	0											1							0	0
2	5	63	9	63	82	21	57	3	65	3	10	-	-	1											0							0	0
2	19	63	9	87	36	2	56	2	35	1	8	-	-	0											1							0	0
3	5	63	9	55	82	29	51	3	64	2	11	-	-	0											0							0	0
3	26	63										-	-	0											0							0	0
4	1	63	36	42	9	14	92	8	51	7	29	-	-	0											0							0	0
4	16	63	36	66	65	5	51	4	66	2	23	-	-	0											0							0	0
5	7	63	67	28	36	27	82	22	26	5	18	-	-	0											1							0	0
5	21	63	36	30	82	21	86	6	70	5	38	-	-	0											2							0	0
6	4	63	36	33	9	16	65	6	26	4	41	-	-	1											4							0	0
6	11	63	9	16	36	8	31	7	92	6	63	-	-	0											19	77	3					0	0
7	2	63										-	-	1											2							0	0
7	9	63	36	41	82	19	70	7	9	7	26	-	-	6	17	1									10	50	2					0	0
7	30	63										-	-	0											1							0	0
8	13	63										-	-	1											0							0	0
9	3	63	67	20	27	12	9	8	36	8	52	-	-	3											0							1	0
9	17	63	36	19	70	17	51	12	9	4	48	-	-	0											1							0	0

PLANKTON POPULATION

STATE NORTH DAKOTA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN MISSOURI-SOURIS RIVERS

STATION LOCATION MISSOURI RIVER AT BISMARCK, NORTH DAKOTA 33

DATE OF SAMPLE			ALGAE (Number per milliliter)										MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																					
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS		INERT DIATOM SHELLS		1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	2	62	400	0	0	0	0	0	0	40	370	40	40																				
10	16	62	500	0	10	30	0	0	0	210	260	0	20	71	1																		
11	7	62	200	0	0	50	0	0	0	0	160	20	110																				
11	20	62	300	0	0	0	0	0	0	0	290	0	60	77	1																		
12	4	62	200	0	0	0	0	0	0	0	240	0	50	77	1																		
12	11	62	500	0	0	0	0	0	0	0	520	0	0	77	2																		
1	9	63	400	0	0	0	0	0	0	40	370	20	70	77	2																		
1	22	63	200	0	0	0	0	0	0	30	170	0	50																				
2	5	63	200	0	0	0	0	0	0	10	180	30	70																				
2	19	63	400	0	0	0	0	0	40	110	240	0	0	77	1																		
3	5	63	300	0	0	0	0	0	10	180	80	10	60	71	1																		
3	26	63	100	0	0	10	0	0	60	0	60	10	60																				
4	1	63	200	0	0	10	0	0	40	100	20	20	40																				
4	16	63	400	0	0	0	0	90	0	290	20	0	0	71	1																		
5	7	63	300	0	0	0	0	30	40	10	200	0	10																				
5	21	63	200	0	0	20	0	20	0	40	150	0	90																				
6	4	63	200	0	0	0	0	20	0	20	130	0	180																				
6	11	63	400	0	0	0	0	0	0	90	290	0	370																				
7	2	63	500	0	20	0	0	20	0	290	160	0	50																				
7	9	63	200	0	0	0	0	0	0	170	80	0	40																				
7	30	63	200	0	0	20	0	20	0	40	80	40	60																				
8	13	63	400	0	30	70	0	30	0	50	220	0	170																				
9	3	63	500	0	0	0	0	40	0	40	440	20	40																				
9	17	63	700	0	20	90	0	20	0	20	560	90	290																				

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE NORTH DAKOTA
MAJOR BASIN MISSOURI RIVER
MINOR BASIN MISSOURI-SOURIS RIVERS
STATION LOCATION MISSOURI RIVER AT BISMARCK, NORTH DAKOTA

33

DATE OF SAMPLE BEGINNING MONTH	DAY	YEAR	END MONTH	DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	CHLORO-FORM	ALCOHOL	CHLOROFORM EXTRACTABLES ETHER INSOLUBLES	WATER SOLUBLES	NEUTRALS TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	26	62	11	18	2243	223	78	145	2	22	24	1	1	20	2	8	5	3	14
12	9	62	1	1	2243	233	33	200	1	9	11	1	1	9	0	4	2	1	5
2	20	63	3	15	2242	194	38	156	1	11	11	1	1	9	0	4	3	1	7
4	8	63	5	1	2242	130	35	95	1	9	12	2	1	8	1	4	2	1	6
5	18	63	6	10	2242	170	56	114	4	17	13	1	1	10	1	5	6	1	10
6	26	63	7	23	2242	211	55	156	–	–	–	–	–	–	–	–	–	–	–
8	12	63	9	4	2167	235	56	179	2	22	14	1	2	11	0	5	4	1	8
9	22	63	10	1	2242	177	48	129	–	–	–	–	–	–	–	–	–	–	–

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE NORTH DAKOTA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN MISSOURI-SOURIS RIVERS

STATION LOCATION MISSOURI RIVER AT BISMARCK, NORTH DAKOTA

33

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	2	62	14.8	-	8.1	-	-	-	-	.3	-	154	218	10	35	-	-	-	140
10	9	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
10	16	62	14.3	-	7.9	-	-	-	-	.2	9	154	214	7	27	180	.0	450	170
10	23	62	10.2	-	8.0	-	-	-	-	.1	-	150	210	15	35	-	-	-	660
10	30	62	10.0	-	8.1	-	-	-	-	.2	-	150	216	8	25	-	-	-	100
11	7	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	150
11	13	62	8.8	-	8.1	-	-	-	-	.1	-	152	214	10	20	-	-	-	140
11	27	62	8.3	-	8.1	-	-	-	-	.4	-	146	218	0	35	-	-	-	370
12	4	62	6.8	-	8.2	-	-	-	-	.2	-	146	214	9	40	-	-	-	-
12	11	62	.2	-	8.2	-	-	-	-	.2	-	148	218	3	50	-	-	-	570
12	18	62	.5	-	8.3	-	-	-	-	.2	-	142	212	7	45	-	-	-	400
1	8	63	3.2	-	8.3	-	-	-	-	.3	-	142	214	7	20	-	-	-	430
1	15	63	2.2	13.2	8.2	.5	17	1.5	-	.3	9	148	224	8	20	180	.0	460	*1
1	22	63	.3	13.1	8.2	.3	15	-	-	.2	8	140	216	5	20	170	.0	435	90
1	29	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	110
1	30	63	.2	11.0		.8	13	2.8	4.5	-	8	-	-	-	-	175	.0	441	-
2	5	63	.4	8.9	8.3	.6	16	1.2	3.9	.2	6	142	216	8	20	175	.0	412	46
2	11	63	.5	8.5	8.3	.7	8	1.1	2.9	.6	7	142	212	5	20	170	.0	397	30
2	19	63	.6	8.9	8.4	.8	9	1.0	2.3	.1	8	138	216	8	20	170	.0	446	40
2	26	63	.5	-	8.3	-	-	-	-	.3	-	146	214	8	20	-	-	-	*1
3	5	63	.5	8.8	8.1	.5	9	1.1	3.9	.3	8	140	210	8	20	170	.0	452	62
3	12	63	.5	8.7	8.1	.8	10	2.1	-	.2	8	142	212	10	20	170	.0	459	56
3	19	63	.5	8.2	8.1	.7	10	1.8	3.7	.2	9	144	220	5	-	170	.0	546	12
3	26	63	5.7	8.4	8.3	-	11	2.1	-	.1	8	146	224	5	40	170	.0	502	84
4	3	63	5.4	-	8.2	-	-	-	-	.2	-	158	236	8	40	-	-	-	180
4	9	63	5.2	-	8.2	-	-	-	-	.2	-	160	236	5	30	-	-	-	90
4	16	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20
4	17	63	8.1	7.3	-	-	10	1.4	4.3	-	10	-	-	-	-	235	.0	487	-
4	23	63	7.7	8.2	8.1	1.2	11	1.2	3.4	.2	8	144	212	15	45	235	.0	472	85
4	30	63	8.8	-	8.2	-	-	-	-	.4	-	148	208	10	40	-	-	-	180
5	7	63	10.0	-	8.1	-	-	-	-	.2	-	146	212	5	20	-	-	-	30
5	14	63	8.3	7.5	8.1	1.1	8	1.2	-	-	9	146	208	15	20	188	.0	412	-
5	21	63	7.5	7.9	8.3	1.3	8	1.4	3.2	.2	10	152	212	15	65	188	.0	472	-
5	28	63	8.2	-	8.2	-	-	-	-	.2	-	144	10	4	20	-	-	-	11
6	4	63	15.5	-	8.0	-	-	-	-	.1	-	148	206	10	65	-	-	-	50
6	11	63	11.2	-	7.9	-	-	-	-	.2	-	146	202	8	110	-	-	-	520
6	18	63	14.0	6.6	8.1	.9	12	1.2	3.7	.1	7	150	210	10	56	195	.0	459	200
6	25	63	14.5	6.5	8.1	1.2	11	-	3.4	.2	11	144	210	3	35	183	.0	452	*1

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE NORTH DAKOTA
MAJOR BASIN MISSOURI RIVER
MINOR BASIN MISSOURI-SOURIS RIVERS
STATION LOCATION MISSOURI RIVER AT BISMARCK, NORTH DAKOTA

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
7	2	63	16.0	-	8.2	-	-	-	-	.4	-	146	220	15	30	-	-	-	350
7	9	63	17.4	-	8.1	-	-	-	-	.4	-	146	218	15	20	-	-	-	200
7	16	63	16.5	-	8.1	-	-	-	-	.4	-	150	222	15	70	-	-	-	800
7	23	63	15.5	6.1	8.0	-	9	.7	-	.3	9	146	222	15	35	203	.0	535	30
7	30	63	17.0	6.2	8.2	.7	10	-	-	.4	9	150	220	10	60	200	.0	518	150
8	6	63	18.8	6.1	8.1	.5	6	.7	-	.3	10	150	212	10	35	190	.0	472	260
8	13	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	140
8	14	63	17.0	6.3	8.1	.7	8	.7	3.4	.2	10	154	216	8	40	198	.0	472	-
8	20	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	140
8	21	63	17.0	6.2	8.3	-	10	1.4	4.5	.3	10	158	220	10	25	225	.0	502	-
8	27	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	300
8	28	63	17.0	6.3	8.2	-	9	1.1	4.1	.2	10	156	216	3	25	225	.0	459	-
9	3	63	19.0	-	8.1	-	-	-	-	.2	-	150	220	8	20	-	-	-	34
9	9	63	15.5	-	8.2	-	-	-	-	.3	-	158	222	10	20	-	-	-	290
9	17	63	15.0	-	8.4	-	-	-	-	.2	-	152	220	5	40	-	-	-	100
9	24	63	13.5	-	8.3	-	-	-	-	.2	-	150	216	10	50	-	-	-	300

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Bismarck, North Dakota
Operated by U.S. Geological Survey

STATE: North Dakota

MAJOR BASIN: Missouri River

MINOR BASIN: Missouri-Souris Rivers

STATION LOCATION: Missouri River at Bismarck, North Dakota

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	8.360	7.260	13.000	13.400	18.900	23.500	12.000	11.700	7.770	14.300	14.800	6.820
2	7.490	7.540	13.100	18.500	18.600	23.800	12.500	9.330	10.800	13.300	14.800	6.820
3	8.840	7.090	13.700	19.700	18.100	23.400	11.800	8.300	12.100	11.900	13.700	6.780
4	8.330	7.200	14.500	19.600	18.800	22.700	11.500	10.100	16.700	12.800	13.300	6.700
5	10.200	7.330	15.400	19.400	18.500	22.900	11.500	8.080	18.800	13.400	13.500	6.730
6	11.000	7.700	14.800	19.000	18.300	23.500	11.400	7.410	20.000	14.000	14.000	6.680
7	9.210	7.770	14.200	19.100	17.900	23.900	10.300	8.580	18.800	14.900	13.700	6.560
8	8.190	7.380	13.800	19.000	17.900	24.100	9.090	9.180	18.800	14.700	14.000	6.580
9	8.250	8.050	14.600	18.900	17.800	24.400	10.000	9.240	19.500	12.500	13.900	6.580
10	8.690	7.640	15.000	17.600	18.700	24.000	12.900	8.530	20.600	12.400	13.700	6.850
11	9.270	7.090	14.800	14.000	18.600	23.700	16.100	9.390	21.000	12.000	12.600	6.750
12	10.600	6.870	14.000	14.000	19.000	23.700	16.600	9.090	19.400	11.600	11.300	6.560
13	12.400	6.750	14.000	15.100	19.600	23.300	12.500	7.860	15.300	11.100	11.300	6.470
14	11.000	6.820	14.000	18.800	20.000	23.700	9.750	9.240	13.200	13.200	10.900	6.680
15	8.140	7.020	16.000	20.500	20.000	24.700	8.280	11.700	12.400	13.400	10.600	7.910
16	7.940	7.310	16.000	21.900	19.900	24.300	9.540	10.500	12.800	17.100	9.580	10.200
17	8.220	7.460	15.500	22.900	20.900	20.900	12.900	9.780	14.900	18.600	7.570	10.800
18	7.830	8.060	15.300	23.000	21.200	22.000	19.000	10.300	19.700	22.400	7.490	12.300
19	7.490	7.460	15.400	22.800	21.700	24.100	21.600	8.250	21.100	23.900	7.490	12.200
20	7.210	8.180	15.400	21.800	21.900	23.800	21.800	10.100	20.100	24.300	7.260	12.100
21	7.210	10.700	16.800	21.100	20.600	22.500	21.900	9.360	19.800	26.800	7.160	12.300
22	7.020	10.900	16.300	23.000	20.800	22.000	22.000	11.900	14.800	25.800	7.060	12.300
23	6.900	10.800	15.400	23.600	23.100	21.000	23.000	11.200	13.600	25.900	6.990	13.800
24	6.820	10.800	13.000	23.500	23.400	20.500	21.400	9.940	12.000	27.200	6.940	11.700
25	7.440	10.800	12.000	24.300	22.200	19.900	24.900	8.530	14.200	26.500	6.940	12.900
26	7.830	10.800	12.000	25.000	22.200	19.700	24.300	7.460	18.300	21.800	7.020	12.600
27	7.180	10.800	12.300	24.100	22.500	19.600	24.800	6.920	20.600	19.600	7.060	12.800
28	6.850	10.900	13.700	22.400	23.000	18.500	19.500	8.050	21.100	17.300	7.020	12.600
29	6.780	11.400	15.700	21.000		17.600	12.500	6.970	19.500	16.600	6.850	12.700
30	7.040	12.600	13.700	20.200		15.300	11.600	8.760	16.800	14.900	6.780	12.500
31	7.060		11.700	19.500		12.400		7.570		15.000	6.820	

MISSOURI RIVER AT WILLISTON, NORTH DAKOTA

This is the most upstream station on the Missouri River in the Water Pollution Surveillance System. It is located about 11 miles below the Montana-North Dakota State line, and 10 miles below the confluence of the Yellowstone River. Samples are collected at the municipal water treatment plant intake. The station is in pool from Garrison Dam.

The concentration of aliphatics in the carbon chloroform extract increased during the early part of 1963. In 19 previous samples taken between January 1962 and February 1963, the range of aliphatics was 1-7 ppb with an average of 2.5. The February 1963 sample, however, had an aliphatics concentration of 15 ppb and the March 1963 sample value was 10 ppb. In April the aliphatics concentration decreased to 6 ppb. The specific substances responsible for this increase were not identifiable from infrared spectra.

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Station Location: Missouri River at Williston, North Dakota

Major Basin: Missouri River

Minor Basin: Missouri-Souris Rivers

Station at: 48°08' Latitude 103°38' Longitude

Miles above mouth: 1553

Activation Date: November 11, 1957

Sampled by: Williston Water Department

Field Analysis by: Williston Water Department
U.S. Public Health Service

Other Cooperating Agencies: North Dakota State Department of Health

Hydrologic Data:

Nearest pertinent gaging station: Near Williston, North Dakota

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 164,500 square miles

Period of record: 1897 - present

Average discharge in record period: 22,300 cfs.

Maximum discharge in record period: 231,000 cfs.

Minimum discharge in record period: 1,320 cfs.

Remarks: Average discharge for period after operational level was reached following closure of Ft. Peck Dam (1943 to present). Extreme discharges occurred prior to closure of dam in 1939.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval	
		10/1/62 - 12/31/62	4/1/63 - 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.71	.50
	Na	58	58
	K	4.8	5.7
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	20	56
	Cd	*5	*4
	As	*50	*50
	B	100	172
	P	*26	54
	Fe	49	99
	Mo	61	17
	Mn	1	6
	Al	-	95
	Be	*.13	*.11
	Cu	8	54
	Ag	*1	1.3
	Ni	*3	*4
	Co	*10	*4
	Pb	*26	*11
	Cr	*3	*11
	V	*5	*22
	Ba	61	41
	Sr	332	280

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	1.5	.3	April to June	2.5	.3
January to March	-	-	July to September	-	-

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE NORTH DAKOTA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN MISSOURI-SOURIS RIVERS

STATION LOCATION MISSOURI RIVER AT WILLISTON, NORTH DAKOTA 34

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON				
			DATE OF DETERMINATION	ALPHA					BETA						DATE OF DETERMINATION	GROSS ACTIVITY			
				SUSPENDED		DISSOLVED		TOTAL	SUSPENDED		DISSOLVED		TOTAL			ALPHA		BETA	
MO	DAY	YR.	MO DAY	pc/l	±	pc/l	±	pc/l ±	pc/l	±	pc/l	±	pc/l	±	MO DAY	pc/g	±	pc/g	±
10	1	62	10 23	-	-	-	-	- -	55	19	42	17	97	25					
10	8	62	11 2	-	-	-	-	- -	10	15	2	12	12	19					
10	15	62	12 5	-	-	-	-	- -	1224	416	50	39	1274	418					
10	22	62	11 20	4	5	4	3	8 6	83	21	25	16	108	26					
10	29	62	11 23	-	-	-	-	- -	12	9	19	11	31	14					
11	26	62	12 21*	1	1	4	3	5 3	9	12	17	17	26	21					
12	31	62	1 16*	0	5	1	3	1 6	42	23	34	18	76	29					
1	28	63	2 20*	5	4	8	4	13 6	4	19	3	18	7	26					
2	25	63	3 23*	0	2	3	3	3 4	53	17	64	17	117	24					
3	25	63	4 15*	2	1	4	2	6 2	22	6	51	8	73	10					
4	29	63	5 17*	3	2	8	4	11 4	34	15	42	17	76	23					
5	27	63	6 17*	2	2	4	3	6 4	24	7	57	8	81	11					
6	24	63	7 24*	1	1	2	2	3 2	20	7	41	9	61	11					
7	29	63	8 19*	0	1	2	2	2 2	10	3	47	7	57	8					
8	26	63	9 25*	2	1	2	3	4 3	16	7	48	17	64	18					
9	30	63	10 23*	1	1	5	3	6 3	11	7	39	17	50	18					

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PLANKTON POPULATION

STATE NORTH DAKOTA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN MISSOURI-SOURIS RIVERS

STATION LOCATION MISSOURI RIVER AT WILLISTON, NORTH DAKOTA 034

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.	MICROINVERTEBRATES																			
			1ST		2ND		3RD		4TH				PROTOZOA (Identifiable) Number per ml.	ROTIFERS											CRUSTACEA							NEMATODES (Identifiable) Number per liter	OTHER ANIMAL FORMS (Number per liter)
														NUM-BER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD		4TH		5TH		NUM-BER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	1	62	65	23	36	20	92	9	71	7	41	-	-	-											-							-	-
10	15	62										20	-	-											-							-	-
11	5	62	92	36	36	16	47	14	65	7	27	50	-	2											0							0	0
11	19	62	9	35	36	18	92	17	50	9	21	-	-	0											0							0	0
12	3	62	92	29	36	28	83	14	71	8	21	-	-	0											0							0	0
12	17	62										-	-	0											0							0	0
1	7	63	9	56	26	10	92	10	80	4	20	-	-	0											0							0	0
1	21	63										-	-	0											0							0	0
2	4	63	27	34	9	28	82	16	70	4	18	-	-	0											0							1	0
2	18	63										-	-	0											0							0	0
3	4	63	9	25	36	18	65	10	80	9	38	-	-	0											0							0	0
3	18	63	9	50	80	21	36	4	26	3	22	-	-	1											0							0	0
4	1	63	80	43	9	32	82	9	70	3	13	-	-	0											0							0	0
4	15	63										-	-	-											-							-	-
5	6	63										-	-	-											-							-	-
5	20	63	9	44	80	24	61	6	92	3	23	-	-	0											0							0	0
6	3	63	80	63	26	10	82	5	70	5	17	-	-	0											0							0	0
6	17	63										-	-	0											0							0	0
7	1	63	61	60	80	33					7	-	-	0											0							0	0
7	15	63										-	-	1											0							0	0
8	5	63	26	19	92	17	47	15	80	8	41	-	-	-											-							-	-
8	19	63	23	17	27	9	26	8	67	7	59	-	-	1											0							0	0
9	2	63										-	-	-											-							-	-
9	17	63	26	48	75	6	61	6	70	5	35	-	-	0											0							0	0

PLANKTON POPULATION

STATE NORTH DAKOTA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN MISSOURI-SOURIS RIVERS

STATION LOCATION MISSOURI RIVER AT WILLISTON, NORTH DAKOTA

DATE OF SAMPLE			ALGAE (Number per milliliter)								INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS			1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILA-MENT-OUS	COCCOID	FILA-MENT-OUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	6900	0	20	210	0	170	0	890	5610	380	1100	87	4	82	3	88	3	92	2	68	2	71	2	81	2	79	1	38	1	91	1
10	15	62	00	0	0	0	0	0	0	20	0	0	0																				
11	5	62	1800	0	0	500	0	20	0	230	1040	70	810	92	2	38	2	77	1	82	1	71	1										
11	19	62	500	0	0	60	0	20	0	30	360	0	390	71	1																		
12	3	62	2000	0	0	40	0	60	0	170	1760	0	170	92	1	82	1	77	1														
12	17	62	200	0	0	0	0	0	0	0	170	20	60	77	1																		
1	7	63	300	0	0	0	0	40	0	20	240	40	90	77	1																		
1	21	63	100	0	20	20	0	0	0	20	90	20	20																				
2	4	63	100	0	10	30	0	0	0	0	70	10	30																				
2	18	63	1000	860	0	0	0	20	110	20	20	20	40	4	3																		
3	4	63	100	0	0	0	0	20	0	0	110	0	60																				
3	18	63	300	0	30	10	0	100	40	40	100	0	40																				
4	1	63	500	0	0	20	0	240	0	150	110	0	0																				
4	15	63	600	0	20	0	0	110	0	70	420	0	330	77	1																		
5	6	63	600	0	30	40	0	10	0	140	340	0	10	77	1																		
5	20	63	600	0	0	0	0	20	0	230	360	20	130	77	1	71	1																
6	3	63	400	0	0	0	0	0	20	150	230	0	0																				
6	17	63	00	0	0	0	0	0	0	0	0	0	0																				
7	1	63	200	0	0	20	0	20	0	110	20	20	0																				
7	15	63	600	0	0	60	0	20	0	410	120	20	40																				
8	5	63	5100	20	40	1780	0	400	20	1940	880	330	240	68	3	69	3	24	2	35	2	71	2	92	2	25	1	38	1				
8	19	63	4100	0	290	1640	0	60	0	640	1450	540	500	25	2	24	2	88	2	68	2	38	2	92	1	22	1	87	1	82	1		
9	2	63	1700	0	0	260	0	330	0	770	330	240	90	51	1	69	1																
9	17	63	1200	0	0	270	0	160	0	360	360	70	160	68	1																		

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE NORTH DAKOTA
MAJOR BASIN MISSOURI RIVER
MINOR BASIN MISSOURI-SOURIS RIVERS
STATION LOCATION MISSOURI RIVER AT WILLISTON, NORTH DAKOTA

DATE OF SAMPLE BEGINNING MONTH	DAY	YEAR	END MONTH	DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	CHLORO-FORM	ALCOHOL	CHLOROFORM EXTRACTABLES ETHER INSOLUBLES	WATER SOLUBLES	NEUTRALS TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	17	62	11	2	4822	76	18	58	0	4	8	2	1	5	0	2	1	0	3
11	3	62	11	19	2768	167	30	137	1	7	13	3	2	7	1	3	1	1	4
11	19	62	12	3	3795	156	36	120	3	10	12	4	3	5	0	3	3	1	4
12	3	62	12	17	4807	100	21	79	0	3	14	5	3	6	0	2	1	0	1
12	16	62	1	3	40000#	126	16	110	-	-	-	-	-	-	-	-	-	-	-
1	14	63	1	28	3420	131	20	111	0	6	8	1	1	6	0	2	1	1	2
2	4	63	2	18	3150	157	53	104	-	-	-	-	-	-	-	-	-	-	-
2	18	63	3	4	5190	164	102	62	2	43	39	15	9	15	0	5	4	2	7
3	4	63	3	18	4698	222	121	101	-	-	-	-	-	-	-	-	-	-	-
3	18	63	4	1	3755	92	36	56	1	6	23	10	6	7	0	2	1	1	2
4	1	63	4	15	4260	136	53	83	-	-	-	-	-	-	-	-	-	-	-
4	15	63	4	29	5017	79	36	43	1	8	17	6	4	6	1	2	1	1	6
5	6	63	5	20	5002	93	43	50	-	-	-	-	-	-	-	-	-	-	-
5	20	63	6	3	5362	84	27	57	1	4	14	4	3	7	0	4	1	0	3
6	3	63	6	17	5422	103	56	47	-	-	-	-	-	-	-	-	-	-	-
7	1	63	7	15	5550	90	46	44	2	10	16	6	4	5	1	5	3	1	9
7	15	63	7	29	5670	88	36	52	-	-	-	-	-	-	-	-	-	-	-
8	5	63	8	18	4957	112	46	66	1	12	19	4	3	11	1	5	3	1	5
8	19	63	9	1	4912	86	27	59	-	-	-	-	-	-	-	-	-	-	-
9	2	63	9	15	5580	69	17	52	0	3	10	4	2	4	0	1	1	0	2
9	16	63	9	29	5377	80	19	61	-	-	-	-	-	-	-	-	-	-	-

ESTIMATED

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE NORTH DAKOTA
MAJOR BASIN MISSOURI RIVER
MINOR BASIN MISSOURI-SOURIS RIVERS
STATION LOCATION MISSOURI RIVER AT WILLISTON, NORTH DAKOTA 34

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	14.0	-	8.4	-	-	-	-	-	-	106	264	-	475	-	-	-	-
10	8	62	14.0	-	8.3	-	-	-	-	-	-	156	248	5	450	-	-	-	-
10	9	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14000
10	14	62	10.0	9.7	8.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	18	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12000
10	22	62	-	-	8.3	-	-	-	-	-	16	160	248	5	340	215	.0	510	15000
10	29	62	10.0	5.9	8.3	1.4	-	-	-	-	10	160	250	0	*25	198	.0	515	-
11	5	62	8.0	8.9	8.2	3.9	-	-	-	-	16	168	256	0	*25	215	.0	535	1900
11	12	62	8.0	11.7	8.3	2.0	-	-	-	-	14	176	260	5	*25	215	.0	504	-
11	13	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1300
11	19	62	3.0	11.0	8.6	7.1	-	-	-	.2	7	168	264	0	*25	215	.0	537	2900
11	26	62	3.0	11.4	8.3	.8	-	.3	3.4	.5	7	160	236	0	*25	205	.0	480	-
11	27	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	940
12	3	62	.4	12.3	8.3	-	-	-	-	-	9	160	245	0	170	190	.0	515	-
12	10	62	1.0	12.7	8.2	5.9	-	.7	3.6	.2	7	152	236	0	145	185	.1	382	-
12	17	62	1.0	13.2	8.4	1.0	-	.8	1.0	.4	12	166	244	0	*25	195	.0	460	-
12	24	62	1.0	13.5	8.3	1.1	-	1.4	2.1	.3	12	172	284	-	55	204	.0	535	-
12	26	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	800
12	31	62	-	-	8.3	-	-	-	-	-	10	186	272	-	105	205	.0	525	-
1	2	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	450
1	7	63	-	-	8.2	-	-	-	-	-	11	188	476	-	*25	215	.0	595	200
1	14	63	1.5	13.2	8.3	1.1	-	.6	2.2	.2	15	176	260	-	*25	165	.0	475	-
1	21	63	1.5	13.1	7.9	2.0	-	.1	3.7	.2	10	180	288	-	*25	182	.1	485	100
1	28	63	3.0	12.6	8.0	1.1	-	.5	2.4	.2	12	196	284	-	*25	215	.0	575	-
1	29	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*8
2	4	63	2.0	12.3	8.2	2.3	-	.5	2.3	.1	12	182	264	5	*25	202	.0	420	-
2	7	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	140
2	11	63	2.0	11.8	8.2	3.4	-	.8	3.2	1.2	11	140	190	20	350	155	.0	380	-
2	13	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	900
2	18	63	1.5	13.3	7.9	2.6	-	1.2	2.7	.2	10	140	288	15	*25	180	.0	410	-
2	19	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	310
2	25	63	1.5	14.3	8.1	.5	-	.2	4.0	.2	9	152	224	15	*25	212	.0	475	-
2	28	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	250
3	4	63	3.0	13.7	8.3	-	-	.4	-	.3	12	150	230	10	*25	175	.0	460	-
3	11	63	5.0	14.3	8.3	1.3	-	.4	2.8	.4	12	140	220	15	70	165	.0	420	-
3	13	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
3	18	63	2.0	14.0	8.3	1.7	-	1.3	4.3	.2	10	148	220	5	*25	200	.0	440	350
3	25	63	2.0	13.4	8.3	2.2	-	1.5	3.1	.5	10	160	240	10	*25	195	.0	460	-
3	28	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE NORTH DAKOTA
MAJOR BASIN MISSOURI RIVER
MINOR BASIN MISSOURI-SOURIS RIVERS
STATION LOCATION MISSOURI RIVER AT WILLISTON, NORTH DAKOTA 34

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
4	1	63	5.0	10.5	8.3	-	-	1.8	2.7	.2	13	140	220	10	*25	175	.0	420	-
4	8	63	-	-	8.2	-	-	-	-	-	13	164	260	10	*25	240	.0	500	-
4	15	63	10.0	10.3	7.4	3.1	-	1.6	3.9	.2	16	180	260	10	850	290	.0	610	-
4	16	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1200
4	22	63	11.0	11.2	7.6	-	-	.6	1.5	.5	16	220	260	5	*25	260	.0	580	-
4	29	63	12.0	10.9	8.3	2.5	-	.2	1.4	.5	19	168	290	10	*25	240	.1	550	-
5	1	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	600
5	5	63	12.0	-	8.1	-	-	.4	1.6	.4	20	144	250	10	230	270	.0	610	2400
5	13	63	13.0	9.8	8.1	1.0	-	.6	3.5	.3	15	164	270	5	*25	240	.0	520	-
5	15	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1700
5	20	63	12.0	9.4	8.1	.6	-	2.4	4.4	-	8	136	210	15	140	156	.0	380	-
5	27	63	14.0	9.0	8.1	.7	-	3.2	4.8	.2	7	110	190	15	*25	130	.4	360	-
6	3	63	21.0	8.1	8.1	.8	-	2.5	4.1	-	6	100	140	5	*25	100	.0	260	-
6	10	63	-	-	-	-	-	-	-	-	7	96	160	30	*25	146	.0	320	-
6	17	63	22.0	8.2	8.3	.1	-	4.6	6.0	-	12	98	190	15	*25	110	.0	290	-
6	24	63	-	-	-	-	-	-	-	-	9	96	160	15	250	126	.0	320	-
7	1	63	2.2	8.4	8.3	.3	-	2.5	5.4	.3	7	96	160	5	*25	116	.0	300	-
7	2	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	500
7	8	63	24.0	7.9	8.1	.0	-	2.5	5.0	.2	9	102	190	5	*25	116	.0	300	-
7	9	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1400
7	15	63	-	-	-	-	-	-	-	-	7	106	180	10	*25	140	.0	320	-
7	23	63	-	-	-	-	-	-	-	-	11	122	220	5	135	164	.0	390	*50
7	29	63	23.0	8.9	8.1	1.6	-	-	-	.2	9	130	250	5	*25	176	.0	390	*50
8	5	63	26.0	9.0	8.5	.4	-	2.7	6.4	.2	14	144	220	15	117	190	.0	440	-
8	7	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10000
8	12	63	-	-	-	-	-	-	-	-	10	160	250	10	*25	200	.0	460	-
8	19	63	25.0	9.8	8.3	.5	-	-	-	.2	-	-	-	-	-	-	-	-	-
8	20	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2000
8	26	63	23.0	9.3	8.6	.1	-	1.3	4.2	.2	12	158	250	5	90	220	.0	480	*170
9	2	63	21.0	10.3	8.3	-	-	1.0	4.0	.3	12	160	260	5	25	210	.0	500	-
9	3	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100
9	9	63	23.0	10.0	7.9	1.8	-	3.2	-	.2	14	160	260	10	*25	240	.0	530	-
9	10	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1000
9	16	63	19.0	10.0	8.1	.3	-	-	-	.2	15	172	270	10	*25	250	.0	390	-
9	17	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*50
9	23	63	17.0	9.5	8.1	.5	-	-	-	.4	14	164	270	10	*25	250	.0	560	-
9	30	63	19.0	9.2	8.3	.6	-	.2	.4	.4	10	160	290	5	120	240	.0	490	7000

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station near Williston, North Dakota
Operated by U.S. Geological Survey

STATE: North Dakota

MAJOR BASIN: Missouri River

MINOR BASIN: Missouri-Souris Rivers

STATION LOCATION: Missouri River at Williston, North Dakota

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	12.700	12.000	17.000	9.820	10.000	19.400	14.200	13.900	35.800	43.400	12.900	9.910
2	12.700	11.900	17.100	9.620	10.800	22.000	13.800	23.400	36.700	43.200	13.200	9.960
3	12.600	12.000	17.600	8.680	12.100	25.000	13.400	22.700	42.800	42.200	12.700	10.500
4	12.300	11.600	17.600	8.780	13.600	26.400	13.100	21.200	50.000	37.400	12.000	13.600
5	12.100	11.400	16.900	10.300	14.900	26.300	12.900	19.000	59.000	33.600	11.300	12.500
6	12.100	11.500	16.100	11.700	15.700	25.600	12.400	17.800	62.300	32.100	10.900	12.200
7	12.200	11.500	16.100	12.400	16.300	23.300	12.300	17.200	78.800	34.000	10.400	12.300
8	12.600	11.600	16.000	12.400	18.900	20.900	11.800	16.700	73.800	33.000	10.100	12.500
9	12.600	11.400	16.200	11.900	23.600	19.600	11.600	16.400	69.400	30.600	9.900	12.400
10	12.200	11.400	16.000	11.800	31.200	19.100	11.500	16.100	66.300	29.300	9.400	12.200
11	12.300	11.300	15.000	11.600	36.600	18.900	11.500	16.800	55.100	27.800	9.000	11.300
12	12.800	11.400	12.000	10.900	41.100	18.500	11.800	19.400	51.000	29.000	8.600	10.900
13	13.800	11.400	11.000	8.730	39.600	18.200	12.300	22.700	49.400	31.400	8.300	10.400
14	13.100	11.300	10.000	6.720	32.500	18.200	12.300	25.500	49.200	31.800	7.900	9.910
15	13.000	11.300	10.000	6.060	25.600	18.300	12.200	25.100	51.200	28.200	7.640	10.500
16	13.800	11.400	12.000	6.260	21.800	17.700	11.900	24.800	54.300	26.100	7.620	11.000
17	14.200	11.400	13.000	6.720	20.100	17.600	11.300	24.600	61.000	24.900	7.620	10.800
18	14.200	11.500	12.000	6.720	18.800	18.000	10.100	23.500	64.700	23.500	7.580	11.800
19	14.000	11.500	12.000	6.590	18.000	17.900	9.940	22.400	70.000	22.100	7.460	11.900
20	13.500	11.700	12.000	6.630	17.900	17.700	10.500	22.100	71.800	20.700	7.820	12.000
21	13.200	12.000	11.000	7.090	18.200	18.000	10.800	22.700	72.600	19.600	7.730	12.300
22	13.100	12.300	10.000	7.160	18.000	18.800	10.800	23.500	70.800	18.800	7.660	12.500
23	13.000	12.600	9.500	7.010	17.300	19.400	11.100	23.900	68.200	18.600	7.800	12.500
24	12.700	14.200	9.000	7.110	15.500	19.000	11.500	23.900	68.200	17.600	8.140	12.500
25	12.600	15.400	8.500	7.740	14.700	18.400	12.100	24.200	67.000	16.200	8.340	12.500
26	12.500	15.700	7.000	8.750	15.400	17.400	11.400	24.900	64.500	16.000	8.320	14.000
27	12.300	15.400	6.700	9.180	16.100	18.000	10.400	26.100	57.500	16.800	8.930	16.600
28	12.200	15.400	6.700	9.380	17.300	18.400	10.800	27.800	51.000	16.500	9.600	16.200
29	12.500	15.900	6.850	9.700		18.300	11.900	30.600	48.900	14.500	9.600	15.500
30	12.300	16.700	7.400	9.670		17.000	12.300	34.800	46.500	13.200	9.700	15.500
31	12.200		8.200	9.640		15.000		36.100		12.800	9.570	

NORTH PLATTE RIVER ABOVE HENRY, NEBRASKA

This pollution surveillance station is located downstream from the Nebraska-Wyoming State line. Samples are taken from the State Highway No. 86 Bridge. Irrigated agriculture is the principal economic activity and sugar beets are the leading crop. Several beet sugar refineries in this area discharge partially treated wastes into the river. These wastes and irrigation return flows have become such a problem in this river reach that a Public Health Service conference in the matter of interstate pollution has been held.

Torrington, Wyoming, about 9 miles upstream, is the nearest municipality above the station. Municipal wastes with a BOD population equivalent of 400 are discharged to the stream from a lagoon. A beet sugar refinery factory discharges a BOD population equivalent of an estimated 370,000.

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Station Location: North Platte River Above Henry, Nebraska

Major Basin: Missouri River

Minor Basin: North Platte River

Station at: 41°59' Latitude 104° 01' Longitude

Miles above mouth: 182 (estimated)

Activation Date: August 21, 1961

Sampled by: West Nebraska Branch Laboratory of Nebraska State Department of Health

Field Analysis by: West Nebraska Branch Laboratory of Nebraska State Department of Health

Other Cooperating Agencies: None

Hydrologic Data:

Nearest pertinent gaging station: At Wyoming-Nebraska state line

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 26,003 square miles including 5,878 square miles probably noncontributing

Period of record: 1929 to present

Average discharge in record period: 680 cfs.

Maximum discharge in record period: 17,900 cfs.

Minimum discharge in record period: 13 cfs. (daily)

Remarks: Flows affected by irrigation diversions and return flows, transbasin diversions, and operation of reservoirs and power plants.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.45	.60
	Na	85	71
	K	3.3	8.0
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	11	572
	Cd	*6	*5
	As	*50	*50
	B	104	159
	P	*28	26
	Fe	34	16
	Mo	62	13
	Mn	1.1	5.2
	Al	–	*26
	Be	*.14	*.13
	Cu	*3	60
	Ag	*1.1	*1.6
	Ni	*3	18
	Co	*11	*5
	Pb	*28	*13
	Cr	*3	*13
	V	*6	*26
	Ba	54	34
	Sr	403	291

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	.6	.2	April to June	2.5	.3
January to March	-	-	July to September	-	-

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE NEBRASKA
MAJOR BASIN MISSOURI RIVER
MINOR BASIN NORTH PLATTE RIVER
STATION LOCATION NORTH PLATTE RIVER ABOVE HENRY, NEBRASKA 94

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON					
			DATE OF DETERMINATION		ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO.	DAY	YR.	MO.	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
10	1	62	10	23	0	1	25	6	25	6	21	12	43	16	64	20						
10	8	62	11	1	0	1	16	5	16	5	9	15	45	12	54	24						
10	15	62	11	6	0	1	20	6	20	6	17	14	58	18	75	23						
10	22	62	11	20	0	1	26	7	26	7	10	12	52	17	62	21						
10	29	62	11	21	1	1	27	7	28	7	19	13	45	17	64	21						
11	5	62	11	27	0	1	18	6	18	6	6	14	25	17	31	22						
11	12	62	12	19	1	1	24	6	25	6	6	12	42	17	48	21						
11	19	62	12	28	1	1	27	7	28	7	12	12	65	18	77	22						
11	26	62	12	21	2	1	23	6	25	6	15	12	50	17	65	21						
12	3	62	12	31	0	1	26	7	26	7	12	7	61	10	73	12						
12	10	62	1	3	0	1	22	6	22	6	4	12	41	18	45	22						
12	17	62	1	7	0	1	22	6	22	6	4	7	34	11	38	13						
12	26	62	1	11	1	1	35	8	36	8	8	11	41	15	49	19						
12	31	62	1	14	0	1	15	3	15	3	10	6	40	7	50	9						
1	7	63	1	24	1	1	37	8	38	8	4	13	41	18	45	22						
1	14	63	1	24	0	2	40	9	40	9	9	25	71	21	80	40						
1	21	63	2	1	2	1	27	7	29	7	23	12	68	17	91	21						
1	28	63	2	11	0	1	16	5	16	5	2	6	41	9	43	11						
2	4	63	2	18	0	2	44	9	44	9	26	7	62	9	88	11						
2	11	63	3	11	0	1	7	4	7	4	9	6	61	9	70	11						
2	18	63	3	4	1	1	38	8	39	8	8	6	44	9	52	11						
2	25	63	3	15	0	1	31	7	31	7	18	10	46	15	64	18						
3	4	63	3	20	0	1	29	7	29	7	17	12	58	17	75	21						
3	11	63	3	28	0	1	36	8	36	8	9	10	48	15	57	18						
3	18	63	4	1	0	1	34	7	34	7	21	6	57	9	78	11						
3	25	63	4	8	1	1	15	5	16	5	9	6	49	9	58	11						
4	1	63	4	18	1	1	21	5	22	5	12	12	87	18	99	22						
4	9	63	4	29	0	1	32	7	32	7	39	7	87	9	126	11						
4	15	63	5	1	1	1	36	7	37	7	9	13	56	19	65	22						
4	22	63	5	6	0	1	19	5	19	5	20	6	69	9	89	11						
4	29	63	5	17	1	1	29	7	30	7	83	14	151	19	234	24						
5	6	63	5	24	1	1	9	4	10	4	55	14	79	17	134	22						
5	13	63	5	31	0	1	13	5	13	5	20	7	38	9	58	11						
5	20	63	6	13	0	1	21	6	21	6	26	13	62	17	88	21						
5	27	63	6	12	0	1	25	6	25	6	16	11	71	18	87	21						
6	3	63	6	17	0	1	17	5	17	5	45	7	78	9	123	11						
6	10	63	7	1	2	2	21	6	23	6	89	8	101	9	190	12						
6	17	63	7	9	1	2	22	6	23	6	128	12	82	18	210	22						
6	24	63	7	15	0	1	36	8	36	8	14	3	64	9	78	9						
7	1	63	7	15	1	1	8	5	9	5	47	4	70	9	117	10						
7	8	63	7	23	3	2	15	5	18	5	116	17	79	17	195	24						

RADIOACTIVITY DETERMINATIONS

STATE NEBRASKA
MAJOR BASIN MISSOURI RIVER
MINOR BASIN NORTH PLATTE RIVER
STATION LOCATION NORTH PLATTE RIVER ABOVE HENRY, NEBRASKA

94

DATE SAMPLE TAKEN			DATE OF DETERMINATION		RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON					
					ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO	DAY	YR	MO	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO	DAY	pc/g	±	pc/g	±
7	22	63	8	7	2	2	10	4	12	4	29	9	46	17	75	19						
7	29	63	8	14	3	1	12	4	14	4	27	8	57	16	84	18						
8	5	63	8	22	1	1	9	4	10	4	16	7	42	16	57	17						
8	12	63	8	29	1	1	18	5	19	5	31	7	41	16	52	17						
8	19	63	9	6	1	1	11	4	12	4	22	7	43	17	65	18						
9	4	63	9	23	1	1	0	1	1	1	24	4	31	7	55	8						
9	9	63	10	1	1	1	21	6	22	6	10	4	37	10	47	11						
9	16	63	10	2	1	1	26	6	27	6	5	6	28	16	33	17						
9	22	63	10	8	1	1	24	6	25	6	5	6	57	18	62	19						
9	29	63	10	17	1	1	39	8	40	8	5	6	33	17	38	18						

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE NEBRASKA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN NORTH PLATTE RIVER

STATION LOCATION NORTH PLATTE RIVER ABOVE HENRY, NEBRASKA

94

DATE OF SAMPLE					GALLONS FILTERED	EXTRACTABLES			CHLOROFORM EXTRACTABLES									
BEGINNING			END								NEUTRALS							
MONTH	DAY	YEAR	MONTH	DAY		TOTAL	CHLORO-FORM	ALCOHOL	ETHER INSOLUBLES	WATER SOLUBLES	TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	1	62	10	6	2948	136	30	106	1	10	9	1	1	7	0	3	2	1	4
11	5	62	11	11	3172	111	18	93	0	4	10	3	2	5	0	2	0	0	2
12	3	62	12	11	3861	160	17	163	0	2	11	4	1	6	0	2	0	0	2
1	7	63	1	10	1076	294	31	263	-	-	-	-	-	-	-	-	-	-	-
2	5	63	2	10	3094	120	17	103	0	5	6	1	1	4	0	2	1	1	2
3	5	63	3	12	4174	126	17	109	-	-	-	-	-	-	-	-	-	-	-
4	1	63	4	8	4420	118	26	92	1	7	9	1	1	7	0	3	1	0	5
5	6	63	5	13	3661	192	56	136	-	-	-	-	-	-	-	-	-	-	-
6	3	63	6	8	2807	162	43	119	4	13	11	2	1	7	1	8	4	1	2
7	1	63	7	8	4124	169	86	83	-	-	-	-	-	-	-	-	-	-	-
8	5	63	8	19	3062	142	40	102	1	12	12	1	1	10	0	4	3	1	7
9	3	63	9	9	3713	123	40	83	-	-	-	-	-	-	-	-	-	-	-

PLANKTON POPULATION

STATE NEBRASKA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN NORTH PLATTE RIVER

STATION LOCATION NORTH PLATTE RIVER ABOVE HENRY, NEBRASKA 094

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml	MICROINVERTEBRATES																			
			1ST		2ND		3RD		4TH				ROTIFERS												CRUSTACEA								
														GENERA AND COUNT LEVEL (See text for Codes)											GENERA AND COUNT LEVEL (See text for Codes)							
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT		PROTOZOA (Identifiable) Number per ml	NUMBER PER LITER	1ST GENUS	1ST COUNT LEVEL	2ND GENUS	2ND COUNT LEVEL	3RD GENUS	3RD COUNT LEVEL	4TH GENUS	4TH COUNT LEVEL	5TH GENUS	5TH COUNT LEVEL	NUMBER PER LITER	1ST GENUS	1ST COUNT LEVEL	2ND GENUS	2ND COUNT LEVEL	3RD GENUS	3RD COUNT LEVEL	NEMATODES (Identifiable) Number per liter	OTHER ANIMAL FORMS (Number per liter)
10	1	62	15	14	36	14	2	7	16	6	59	20	-	27	11	2	17	1							0							0	0
10	15	62	36	23	33	11	2	9	92	6	51	+	-	0											0							0	0
11	5	62	36	35	33	20	92	8	2	6	31	-	-	0											0							0	0
11	19	62	36	44	33	15	71	9	92	5	27	230	-	0											0							0	0
12	3	62	36	31	92	18	31	16	71	7	28	50	-	0											0							0	0
12	17	62	36	14	9	14	33	14	51	10	48	40	-	0											0							0	0
1	7	63	71	15	36	12	92	10	31	5	58	+	-	0											0							0	0
1	21	63	82	25	33	11	71	7	2	6	51	+	-	0											0							0	0
2	4	63	33	22	71	19	36	14	92	6	39	+	-	0											0							0	0
2	18	63	71	28	33	11	92	9	65	8	44	+	-	0											0							0	0
3	4	63	71	35	33	16	36	5	12	4	40	+	-	0											0							0	0
3	18	63	71	37	33	19	65	9	36	5	30	+	-	0											0							0	1
4	1	63	71	16	36	14	33	10	65	9	51	+	-	0											0							0	0
4	15	63	36	50	31	13	71	6	92	5	26	+	-	1											0							0	0
5	6	63	33	17	31	12	71	8	36	8	55	+	-	-											0							0	0
5	20	63	33	11	36	10	15	6	6	6	67	+	-	-											-							-	-
6	3	63	6	30	2	10	36	9	15	7	44	+	-	-											-							-	-
6	17	63	2	29	2	11	36	11	31	8	49	+	-	-											-							-	-
8	5	63										+	-	-											-							-	-
8	19	63										+	-	-											-							-	-
9	4	63										+	-	-											-							-	-
9	16	63										+	-	-											-							-	-

PLANKTON POPULATION

STATE NEBRASKA
MAJOR BASIN MISSOURI RIVER
MINOR BASIN NORTH PLATTE RIVER
STATION LOCATION NORTH PLATTE RIVER ABOVE HENRY, NEBRASKA 94

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	2700	0	270	50	0	20	0	470	1940	270	1350	79	2	68	2	82	2	12	1	73	1	81	1	87	1						
10	15	62	2900	0	0	0	0	0	0	330	2570	0	410	82	3	88	2	68	2	81	2	73	1	87	1	92	1						
11	5	62	2400	0	0	0	0	60	0	0	2360	0	170	82	3	81	2	88	1	92	1	87	1	73	1								
11	19	62	3200	0	0	40	0	0	0	210	2940	0	290	82	4	81	2	88	1	87	1												
12	3	62	500	0	0	0	0	0	0	70	470	0	450																				
12	17	62	1300	0	0	0	0	0	0	200	1080	20	590	81	2	82	1	85	1														
1	7	63	700	0	0	0	0	0	0	110	620	20	750	82	1	88	1	81	1														
1	21	63	300	0	0	0	0	20	0	70	220	0	310																				
2	4	63	1500	0	0	20	0	40	0	180	1210	0	2730	81	1	88	1	82	1														
2	18	63	1300	0	0	20	0	0	90	150	750	70	1340	88	1	87	1																
3	4	63	1500	0	0	20	0	20	20	180	1210	20	1670	88	2	81	1																
3	18	63	1200	0	0	20	0	60	230	20	820	40	2460	88	2	65	1	81	1														
4	1	63	1100	0	20	0	0	40	0	0	1060	0	1690	87	1	88	1	82	1	81	1												
4	15	63	1400	0	0	0	0	20	0	0	1410	0	1410	82	3	81	1																
5	6	63	1400	0	0	0	0	0	0	70	1320	0	3300	81	2																		
5	20	63	300	0	0	0	0	0	0	70	220	0	440																				
6	3	63	600	0	0	20	0	0	0	0	590	20	1140	75	2																		
6	17	63	14600	0	340	1090	0	40	210	630	12240	130	3400	75	5	73	4	82	4	81	3	87	3	88	3	85	3	38	3	79	3	91	2
8	5	63	1900	0	340	450	0	30	0	120	1010	420	1330																				
8	19	63	1700	0	20	350	0	110	0	900	300	130	1270																				
9	4	63	1800	0	0	130	0	0	0	200	1430	40	640	84	1																		
9	16	63	2800	0	430	180	0	450	0	450	1270	50	610	12	2	51	2																

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE NEBRASKA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN NORTH PLATTE RIVER

STATION LOCATION NORTH PLATTE RIVER ABOVE HENRY, NEBRASKA

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	12.0	9.6	8.0	2.0	–	–	–	–	22	178	244	13	125	224	.4	542	21000
10	8	62	12.0	9.1	8.0	1.5	–	–	–	–	23	186	224	12	90	245	.4	543	2800
10	15	62	11.0	9.3	8.0	3.1	0	–	–	–	23	188	280	13	175	252	.4	541	24000
10	22	62	10.0	9.0	8.0	3.9	36	–	–	–	24	174	248	12	150	244	.4	564	–
10	29	62	9.0	9.1	8.0	5.2	24	–	–	–	24	176	240	10	100	260	.4	559	43000
11	5	62	8.0	8.5	8.1	6.1	30	–	–	–	24	186	264	10	90	204	.4	524	32000
11	12	62	6.0	9.0	8.1	5.6	18	–	–	–	25	200	260	12	150	240	.4	602	20000
11	19	62	4.0	9.9	8.0	4.9	18	–	–	–	17	200	290	14	120	194	.4	608	13000
11	26	62	6.0	9.5	8.0	4.8	25	–	–	–	16	220	260	12	130	210	.4	548	42000
12	3	62	6.0	9.0	8.0	2.7	30	–	–	–	17	185	240	12	110	220	.4	573	36000
12	10	62	3.5	9.1	8.0	6.0	51	–	–	–	19	204	286	13	140	196	.4	559	30000
12	17	62	6.0	10.1	8.0	3.5	20	–	–	–	19	210	256	10	100	184	.4	583	6600
12	26	62	.0	10.8	8.0	5.0	23	–	–	–	18	220	284	8	70	190	.4	603	2000
12	31	62	1.0	11.2	8.0	2.6	29	–	–	–	18	192	256	8	100	196	.4	570	2000
1	7	63	.5	11.5	8.1	2.3	19	–	–	–	20	210	256	12	90	192	.4	565	1000
1	14	63	.0	9.2	8.1	4.3	28	–	–	–	20	250	258	7	100	228	.5	702	900
1	21	63	.0	10.6	8.0	1.8	20	–	–	–	18	220	264	5	50	228	.5	619	100
1	28	63	3.0	9.2	8.1	3.0	28	–	–	–	16	206	256	5	190	160	.5	524	500
2	4	63	5.0	8.9	8.0	9.3	21	–	–	–	17	196	272	12	300	184	.5	542	500
2	11	63	.0	11.9	8.0	1.8	22	–	–	–	18	208	280	10	100	184	.4	605	1000
2	18	63	5.0	10.5	8.0	1.6	28	–	–	–	19	210	272	15	90	186	.5	555	500
2	25	63	4.0	11.0	8.0	1.1	20	–	–	–	21	220	264	12	95	192	.4	588	*200
3	4	63	3.0	11.6	8.0	1.5	22	–	–	–	19	198	280	13	100	186	.4	584	100
3	11	63	5.0	10.7	8.0	1.5	16	–	–	–	20	200	288	10	125	176	.5	536	*200
3	18	63	6.0	11.0	8.0	1.2	20	–	–	–	19	198	296	12	150	244	.4	588	100
3	25	63	9.0	10.3	8.1	1.4	26	–	–	–	19	198	280	15	160	196	.4	590	*200
4	1	63	12.0	9.6	8.0	2.0	20	–	–	–	17	180	282	14	130	194	.4	561	100
4	8	63	15.0	9.2	8.0	2.7	19	–	–	–	19	182	264	12	140	184	.4	525	1000
4	15	63	15.0	9.4	8.0	6.7	22	–	–	–	19	194	320	10	130	190	.4	543	500
4	22	63	4.0	10.9	8.0	1.6	20	–	–	–	19	182	284	10	130	186	.4	557	500
4	29	63	8.0	10.1	8.0	2.3	23	–	–	–	18	194	272	13	130	186	.4	582	2100
5	6	63	18.0	8.2	8.0	3.0	36	–	–	.0	16	140	240	15	330	176	.4	460	29000
5	13	63	14.0	8.5	8.0	2.0	24	–	–	.0	16	134	264	15	200	184	.4	484	100
5	20	63	14.0	8.9	8.0	2.1	18	–	–	.0	18	160	288	10	140	190	.4	500	1000
5	27	63	14.0	8.7	8.0	1.0	22	–	–	.0	18	148	270	12	130	190	.4	533	100
6	3	63	19.0	8.5	8.0	1.3	24	–	–	.2	17	176	272	15	200	176	.4	535	500
6	10	63	17.0	8.8	8.0	1.8	24	–	–	.5	17	180	264	10	270	144	.4	560	10000
6	17	63	18.0	8.3	8.0	2.7	29	–	–	.2	18	160	272	20	450	132	.4	504	1000
6	24	63	21.0	7.8	8.0	1.3	20	–	–	.2	19	200	272	10	190	132	.4	544	–

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE NEBRASKA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN NORTH PLATTE RIVER

STATION LOCATION NORTH PLATTE RIVER ABOVE HENRY, NEBRASKA

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 mL
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
7	1	63	22.0	7.2	8.0	1.8	28	–	–	.2	15	136	256	15	340	184	.4	455	–
7	8	63	21.0	7.0	8.0	1.8	32	–	–	.2	15	142	240	23	575	136	.4	388	1000
7	15	63	22.0	7.1	8.0	1.3	24	–	–	–	15	142	264	20	500	124	.5	421	–
7	22	63	23.0	7.0	8.0	2.3	26	–	–	.2	19	140	272	18	480	120	.4	400	100
7	29	63	21.0	7.3	8.0	1.5	26	–	–	.1	15	142	280	17	270	132	.4	452	100
8	5	63	22.0	7.2	8.0	1.6	26	–	–	.1	14	148	288	20	230	150	.3	412	100
8	12	63	22.0	7.6	8.0	2.2	21	–	–	.1	15	144	280	18	175	159	.4	418	1000
8	19	63	21.0	7.3	8.0	1.6	21	–	–	.2	16	144	248	17	210	158	.4	426	300
8	26	63	22.0	7.4	8.1	1.1	24	–	–	.2	15	158	276	15	153	156	.4	462	*10
9	2	63	21.0	7.3	8.0	1.8	21	–	–	.2	16	144	248	17	210	153	.4	426	–
9	4	63	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	420
9	9	63	20.0	8.0	8.1	1.3	24	–	–	.2	16	174	288	15	165	148	.4	510	310
9	16	63	19.0	8.3	8.1	2.1	21	–	–	.2	17	168	296	17	240	156	.4	512	–
9	23	63	16.0	7.9	8.1	1.4	21	–	–	.2	19	192	244	12	400	170	.4	540	1000
9	30	63	15.0	9.0	8.1	2.0	20	–	–	.2	17	202	240	10	150	130	.4	461	100

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Wyoming-Nebraska State Line
Operated by U.S. Geological Survey

STATE: Nebraska

MAJOR BASIN: Missouri River

MINOR BASIN: North Platte River

STATION LOCATION: North Platte River above Henry, Nebraska

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	.670	.386	.315	.300	.398	.285	.320	.192	.238	1.180	1.160	1.050
2	.670	.386	.320	.300	.452	.295	.330	.606	.222	1.270	1.160	.984
3	.614	.380	.320	.285	.310	.335	.330	1.030	.226	1.290	1.140	.873
4	.593	.374	.320	.280	.325	.305	.325	1.150	.234	1.360	1.150	.740
5	.579	.368	.310	.275	.325	.285	.320	1.100	.320	1.350	1.160	.698
6	.579	.368	.315	.270	.315	.320	.300	1.040	.242	1.390	1.120	.670
7	.565	.368	.320	.275	.300	.350	.290	1.050	.238	1.440	1.120	.621
8	.558	.380	.325	.280	.300	.362	.280	1.030	.305	1.760	1.120	.593
9	.544	.374	.325	.285	.275	.356	.280	1.070	.325	1.570	1.100	.586
10	.537	.368	.315	.250	.265	.320	.290	1.110	.310	1.440	1.110	.579
11	.537	.362	.310	.144	.260	.295	.280	1.130	.295	1.380	1.110	.572
12	.537	.356	.310	.144	.260	.285	.270	1.170	.285	1.300	1.100	.579
13	.524	.350	.315	.150	.260	.280	.260	1.140	.280	1.310	1.100	.572
14	.512	.345	.315	.200	.265	.320	.255	1.180	.290	1.290	1.100	.572
15	.494	.340	.310	.234	.275	.350	.255	1.150	.380	1.210	1.110	.593
16	.494	.340	.305	.230	.275	.380	.255	1.060	.404	1.160	1.120	.628
17	.488	.340	.305	.238	.275	.330	.250	.810	.434	1.140	1.160	.684
18	.488	.335	.300	.242	.270	.310	.242	.452	.506	1.160	1.290	.726
19	.482	.335	.305	.200	.265	.300	.230	.380	.488	1.130	1.260	.789
20	.470	.335	.305	.230	.270	.290	.230	.330	.410	1.110	1.220	.817
21	.452	.335	.300	.270	.270	.285	.230	.275	.356	1.160	1.220	.852
22	.446	.335	.295	.280	.275	.275	.230	.246	.325	1.200	1.160	.810
23	.440	.335	.280	.210	.275	.290	.226	.222	.255	1.200	1.120	.775
24	.434	.345	.275	.190	.275	.380	.226	.222	.168	1.160	1.060	.705
25	.434	.345	.270	.180	.270	.320	.226	.214	.140	1.180	.992	.642
26	.434	.335	.275	.175	.260	.290	.226	.189	.204	1.230	.952	.635
27	.434	.320	.320	.175	.265	.310	.234	.172	.691	1.280	.944	.614
28	.410	.315	.310	.175	.275	.320	.234	.154	.803	1.280	.928	.614
29	.398	.315	.295	.180		.315	.234	.269	.896	1.260	.936	.579
30	.392	.315	.295	.190		.310	.214	.572	1.070	1.230	.904	.600
31	.386		.300	.300		.310		.265		1.190	.896	

PLATTE RIVER ABOVE PLATTSMOUTH, NEBRASKA

This station is located two miles above the confluence of the Platte River with the Missouri River. Samples are collected at U.S. Highway 73 Bridge. Louisville, Nebraska, 15 miles upstream, discharges raw sewage from a connected population of about 300 into the river. The river flows across the entire State and receives wastes from almost every community along the way. These discharges range from raw sewage to secondary effluent. The lower portion of the Platte River valley supports a diversified agricultural economy. No Nebraska communities use the Platte River for water supply.

Station Location: Platte River above Plattsmouth, Nebraska

Major Basin: Missouri River

Minor Basin: Lower Missouri below Niobrara River

Station at: 41°04' Latitude 95°58' Longitude

Miles above mouth: 2

Activation Date: August 2, 1961

Sampled by: Nebraska State Department of Health
City of Plattsmouth, Nebraska

Field Analysis by: Nebraska State Department of Health

Other Cooperating Agencies: None

Hydrologic Data:

Nearest pertinent gaging station: Near South Bend, Nebraska

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 85,500 square miles

Period of record: 1953 to present

Average discharge in record period: 5,241 cfs.

Maximum discharge in record period: 124,000 cfs.

Minimum discharge in record period: 240 cfs. (daily)

Remarks: Flows affected by irrigation diversions and return flows, and by operation of reservoirs and power plants.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite 10/1/62 to 12/31/62	Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.52	.50
	Na	60	54
	K	8.9	8.0
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	56	30
	Cd	*5	*4
	As	*45	*40
	B	77	68
	P	*11	100
	Fe	50	44
	Mo	*5	*10
	Mn	*2.3	*40
	Al	–	106
	Be	*.11	*.1
	Cu	*5	22
	Ag	*.9	1.2
	Ni	*5	*4
	Co	*9	*4
	Pb	*11	*10
	Cr	*2	*10
	V	*5	*20
	Ba	43	112
	Sr	293	200

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	2.3	.3	April to June	–	–
January to March	–	–	July to September	5.2	.4

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE NEBRASKA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION PLATTE RIVER ABOVE
PLATTSMOUTH, NEBRASKA 86

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON					
			DATE OF DETERMINATION		ALPHA						BETA							GROSS ACTIVITY		
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL		DATE OF DETERMINATION	ALPHA		BETA	
MO	DAY	YR	MO	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO DAY	pc/g	±	pc/g	±
10	1	62	11	15		6		1	7	4	30	18	42	16	72	24					
10	9	62	11	1		3		3	6	6	130	65	46	15	176	70					
10	16	62	12	14		0		1	1	1	3	5	11	7	14	9					
10	23	62	11	17		1		4	5	2	5	14	10	15	15	21					
10	30	62	11	21		1		1	1	1	38	16	26	16	64	23					
11	6	62	12	3		2		4	6	4	20	18	61	19	81	24					
11	13	62	12	4		2		3	5	3	29	9	29	10	58	13					
11	20	62	12	3		3		9	12	4	34	14	38	14	72	20					
11	27	62	12	18		3		6	9	7	10	61	36	16	46	63					
12	4	62	12	27		3		8	11	4	34	15	35	14	69	20					
12	11	62	1	9		1		6	7	3	13	8	39	10	52	13					
12	18	62	1	9		1		8	9	4	5	13	38	18	43	22					
12	24	62	1	10		1		7	8	3	117	16	35	17	152	23					
1	2	63	1	18		1		4	5	3	11	13	36	17	47	21					
1	8	63	1	21		2		5	7	3	25	7	25	8	53	11					
1	15	63	1	25		2		6	8	4	12	13	41	18	53	22					
1	22	63	2	6		2		4	6	3	1	14	36	17	37	22					
1	28	63	2	14		2		7	9	4	11	12	40	17	51	21					
2	4	63	2	18		2		5	6	3	8	6	35	9	43	11					
2	12	63	3	1		2		4	6	3	18	14	33	15	51	21					
2	18	63	3	7		2		11	13	4	37	16	39	16	78	23					
2	26	63	4	12	0	1	11	6	11	4	16	14	35	17	51	22					
3	6	63	3	25		4	6	10	5	2	103	11	52	6	155	13					
3	12	63	3	26	52	33	2	54	33	2	400	96	64	8	464	98					
3	19	63	4	4	52	23	3	51	23	2	478	104	43	16	535	105					
3	26	63	4	10	35	18	8	43	18	4	541	89	458	56	999	102					
4	2	63	4	19		4	6	13	5	3	75	18	155	18	230	25					
4	9	63	4	29		2	3	5	3	2	42	8	44	6	86	10					
4	16	63	4	29		5	4	9	4	3	100	10	57	8	157	13					
4	22	63	5	15		2	7	9	4	3	56	12	45	16	101	22					
4	30	63	5	17	14	3	3	17	6	3	362	29	108	17	471	34					
5	7	63	6	7	7	2	2	9	3	2	127	63	84	16	211	71					
5	14	63	5	31	0	2	3	3	3	2	81	10	66	10	147	14					
5	21	63	6	5	6	4	3	9	4	3	108	31	67	16	175	35					
5	28	63	6	12	4	3	5	9	4	3	143	19	84	18	227	26					
6	4	63	6	17	3	3	5	8	5	3	110	10	57	8	167	13					
6	11	63	7	1	12	7	7	19	8	3	320	24	117	9	437	26					
6	18	63	7	1	5	3	5	10	5	2	165	22	80	13	245	26					
6	25	63	7	29	173	107	2	175	107	1	1367	262	77	9	1444	262					

RADIOACTIVITY DETERMINATIONS

STATE NEBRASKA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION PLATTE RIVER ABOVE PLATTSMOUTH, NEBRASKA 65

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON					
			DATE OF DETERMINATION		ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO.	DAY	YR.	MO.	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO.	DAY	pc/g	±	pc/g	±
7	3	63	7	23	6	6	5	4	12	7	94	50	79	14	173	52						
7	9	63	7	31	5	3	3	3	8	4	61	16	68	16	129	23						
7	16	63	8	7	2	2	3	3	5	4	28	14	14	15	42	21						
7	23	63	8	14	3	2	6	4	9	4	41	15	69	19	110	24						
7	30	63	8	14	1	1	2	4	3	4	29	7	57	18	86	19						
8	6	63	8	19	3	2	4	3	7	4	93	9	68	8	161	12						
8	13	63	8	27	4	3	3	2	7	4	57	16	40	16	97	23						
8	21	63	9	16	0	1	2	3	2	3	11	6	42	9	53	11						
8	27	63	9	17	0	1	1	4	1	4	9	12	23	28	32	30						
9	3	63	9	23	22	13	1	1	23	13	214	39	39	7	253	40						
9	9	63	10	2	4	3	3	3	7	4	70	18	47	16	117	24						
9	17	63	10	4	9	5	4	2	13	5	82	19	47	9	129	21						
9	23	63	10	14	5	5	0	2	5	5	130	12	50	9	180	15						

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE NEBRASKA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION PLATTE RIVER ABOVE PLATTSMOUTH, NEBRASKA 86

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDE[c] mg/l	ALKALINITY [c]mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	2	62	15.0	10.0	8.0	2.4	63	-	-	.5	152	156	184	-	129	96	.8	492	-
10	9	62	17.0	9.4	7.9	3.6	56	-	-	.3	56	156	176	-	389	72	1.0	322	-
10	16	62	16.0	10.5	8.3	3.6	44	-	-	.3	90	168	184	-	149	83	.8	428	-
10	23	62	12.0	10.5	7.9	1.8	47	-	-	.1	48	160	180	-	187	90	.6	388	-
11	6	62	7.0	12.3	8.2	2.4	20	-	-	.1	72	164	200	-	119	78	.8	449	-
11	20	62	5.0	12.5	8.0	3.6	35	-	-	.4	68	172	200	-	176	83	.6	456	-
11	27	62	8.0	11.8	7.8	1.2	35	-	-	.6	66	168	200	-	145	92	.5	444	-
12	11	62	3.0	12.8	7.9	1.8	22	-	-	1.6	74	208	240	-	47	114	.9	548	-
12	18	62	4.0	12.0	8.0	-	40	-	-	.7	130	204	224	-	40	99	1.0	-	-
12	24	62	3.0	13.6	7.7	-	28	-	-	.6	54	176	204	-	136	90	.7	249	-
1	2	63	3.0	13.1	7.7	1.2	32	-	-	.8	90	208	228	-	57	79	.9	460	-
1	8	63	4.0	13.2	7.6	1.8	24	-	-	.7	68	180	204	-	48	90	.7	354	-
1	15	63	3.0	12.2	7.9	1.5	43	-	-	.9	108	228	256	-	14	95	1.0	608	-
1	28	63	4.0	7.2	7.3	.9	34	-	-	1.0	94	212	240	-	17	118	1.1	564	-
2	18	63	3.0	10.5	7.3	1.5	51	-	-	.9	78	168	232	-	168	65	.7	402	-
2	26	63	2.0	12.5	7.2	1.2	17	-	-	.9	76	180	208	-	56	59	.8	418	-
3	6	63	3.0	12.5	7.3	1.8	59	-	-	1.5	36	136	164	-	240	63	1.2	318	-
3	12	63	3.0	11.0	7.1	9.0	210	-	-	.4	44	112	132	-	2835	51	.7	408	-
3	19	63	6.0	11.2	7.3	9.9	190	-	-	.5	66	160	192	-	1040	82	.6	454	-
4	16	63	17.0	10.0	8.1	1.8	36	-	-	.3	66	172	204	-	168	54	.5	422	-
4	23	63	10.0	10.5	8.3	2.1	39	-	-	.4	62	176	200	-	104	64	.7	430	-
4	30	63	12.0	10.3	7.8	2.1	43	-	-	1.1	68	172	192	-	200	37	.5	390	-
5	14	63	24.0	9.4	8.3	4.2	40	-	-	.1	88	188	200	-	128	34	.9	482	-
5	21	63	17.0	9.4	7.9	3.0	44	-	-	.8	62	172	180	-	236	30	.7	302	-
5	28	63	19.0	8.1	7.7	3.0	48	-	-	.8	101	188	196	-	192	32	.8	382	-
6	4	63	29.0	8.4	8.1	6.9	82	-	-	.4	82	176	188	-	232	34	1.3	402	-
6	11	63	25.0	7.8	7.5	3.6	70	-	-	.8	92	152	188	-	532	55	.8	534	-
6	18	63	28.0	8.2	8.4	3.6	57	-	-	.7	92	168	180	-	264	35	1.4	412	-
6	25	63	25.0	6.6	6.9	7.8	-	-	-	.1	29	64	56	-	5200	14	.6	192	-
7	3	63	27.0	7.0	8.0	4.5	59	-	-	1.0	64	184	188	-	316	59	1.5	392	-
7	16	63	32.0	8.8	7.8	3.6	48	-	-	.2	94	96	156	-	168	27	1.7	522	-
7	23	63	32.0	7.9	8.4	2.4	64	-	-	.5	158	204	220	-	116	39	2.1	496	-
7	30	63	25.0	8.3	8.2	5.7	64	-	-	.3	220	220	244	-	56	47	2.0	712	-
8	6	63	28.0	8.4	7.6	2.1	58	-	-	1.2	134	180	180	-	196	31	1.5	490	-
8	13	63	26.0	9.0	8.3	3.0	54	-	-	1.1	128	164	156	-	212	28	1.5	448	-
8	22	63	25.0	8.7	8.6	6.3	58	-	-	1.1	206	196	212	-	96	42	1.5	652	-
9	3	63	26.0	7.5	7.4	5.0	66	-	-	1.5	156	148	112	-	736	26	1.6	456	-
9	9	63	28.0	7.3	8.2	4.8	67	-	-	.5	114	140	140	-	284	24	1.1	422	-
9	17	63	23.0	8.0	7.3	3.2	63	-	-	.8	82	148	156	-	592	28	.8	302	-
9	23	63	18.0	9.1	7.6	3.0	67	-	-	.3	100	140	142	-	652	29	.6	390	-

PLANKTON POPULATION

STATE NEBRASKA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION PLATTE RIVER ABOVE
PLATTSMOUTH, NEBRASKA 086

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml.)	MICROINVERTEBRATES																													
			1ST		2ND		3RD		4TH				PROTOZOA (Identifiable) (Number per ml.)	ROTIFERS														CRUSTACEA										NEMATODES (Identifiable) (Number per liter)	OTHER ANIMAL FORMS (Number per liter)	
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)											
															1ST		2ND		3RD		4TH		5TH						1ST		2ND		3RD							
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL			GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL							
10	2	62	46	40	26	12	73	4	71	4	40	80	0	-													-										0	0
10	16	62	46	32	26	10	82	9	80	5	44	40	-	0													0										0	0
11	6	62	46	24	73	10	48	8	71	8	50	-	-	0													0										0	0
11	20	62	46	36	80	11	71	6	36	5	42	80	-	0													0										0	0
12	4	62	46	25	45	21	71	6	92	4	44	-	-	0													0										0	0
12	18	62	46	15	47	15	82	14	71	7	49	-	-	0													0										0	0
1	8	63	46	22	70	10	48	10	80	8	50	40	-	0													0										0	0
1	22	63											-	0													0										0	0
2	4	63	46	18	70	11	73	6	48	5	60	-	-	0													0										0	0
2	18	63	71	29	46	24	92	6	74	5	36	-	-	0													0										0	0
3	6	63	46	30	71	22	92	9	36	4	35	-	-	0													0										0	0
3	19	63										-	-	-													-										-	-
4	2	63	46	25	45	16	49	12	71	8	39	-	-	0													0										0	0
4	16	63	45	62	46	9	55	4	78	4	21	-	-	0													0										0	0
5	7	63										-	-	-													-										-	-
5	21	63	45	47	82	15	92	6	46	6	26	-	-	-													-										-	-
6	4	63	45	27	46	13	71	10	26	6	44	-	-	-													-										-	-
6	18	63	46	30	45	10	82	7	71	7	46	-	-	-													-										-	-
8	6	63										-	-	-													-										-	-
8	21	63										-	-	-													-										-	-
9	3	63										-	-	-													-										-	-
9	17	63										-	-	-													-										-	-

PLANKTON POPULATION

STATE NEBRASKA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN LOWER MISSOURI BELOW NIOBRARA RIVER

STATION LOCATION PLATTE RIVER ABOVE PLATTSMOUTH, NEBRASKA 86

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	2	62	68100	460	0	10020	500	1410	290	26500	28940	6960	4390	68	7	38	6	84	5	25	4	51	4	69	3	71	3	88	3	50	2	24	2
10	16	62	57600	1040	0	10930	0	1530	0	29480	14610	5590	3730	84	8	38	6	87	6	88	6	71	5	69	5	68	4	25	4	92	4	83	4
11	6	62	3300	20	90	700	0	70	0	860	1530	1100	3060	38	2	71	2	87	1	88	1	97	1	68	1	84	1	69	1				
11	20	62	14800	0	120	250	0	170	0	2030	12210	620	2280	88	5	87	4	71	4	82	4	99	3	85	3	79	3	84	3	98	3	83	3
12	4	62	15700	0	0	2660	0	80	0	4020	8760	620	3110	38	4	68	4	71	4	88	4	91	3	97	3	92	3	24	3	80	2	87	2
12	18	62	300	0	20	110	0	0	0	70	130	150	530																				
1	8	63	300	0	0	40	0	0	0	70	200	70	350																				
1	22	63	200	0	0	20	0	30	0	40	70	0	220																				
2	4	63	200	0	0	0	0	50	0	50	90	20	310																				
2	18	63	800	0	0	20	0	70	40	0	660	70	1340	88	1																		
3	6	63	700	0	0	0	0	180	20	40	460	40	730																				
3	19	63	1000	0	0	0	0	110	0	130	800	230	1530	84	1																		
4	2	63	8800	0	380	1110	0	1010	710	800	4770	760	3040	51	3	84	3	88	3	62	2	98	2	97	2	87	2	17	2	38	2	55	2
4	16	63	18200	210	210	2770	0	2140	250	8820	3820	7010	5630	71	6	68	3	51	3	24	3	38	3	84	3	65	3	52	2	97	2	98	2
5	7	63	8900	0	0	4120	20	440	190	950	3150	690	1910	24	5	38	3	84	2	51	2	69	1										
5	21	63	40900	180	220	31170	0	370	0	4290	4690	4800	5100	24	7	38	7	84	5	71	5	25	4	88	3	68	2	26	2	92	2	51	1
6	4	63	64400	1550	1970	36710	0	1720	0	11510	10960	9070	8530	24	7	38	7	71	6	68	5	88	5	26	5	25	5	17	4	82	3	87	3
6	18	63	22600	0	250	9110	0	630	0	5720	6890	1240	2920	24	5	38	5	71	5	68	5	84	4	88	4	87	3	27	3	92	2	51	2
8	6	63	14100	190	40	3540	20	330	20	4140	5800	2170	2190	38	4	69	3	24	2	32	1	25	1	35	1	37	1						
8	21	63	79400	1630	690	37630	0	130	0	30010	9290	6580	6280	38	5	25	4	31	3	34	3	35	3	44	3	3	3	11	3	2	2	30	2
9	3	63	*	-	-	-	-	-	-	-	-	-	-																				
9	17	63	18300	0	20	11820	0	540	0	3220	2750	1690	5630	38	6	25	4	24	4	84	2	35	1	31	1	45	1	30	1	37	1	29	1

* TOO TURBID TO COUNT

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station near South Bend, Nebraska
Operated by U.S. Geological Survey

STATE Nebraska

MAJOR BASIN Missouri River

MINOR BASIN Lower Missouri below Niobrara River

STATION LOCATION Platte River above
Plattsmouth, Nebraska

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	4.550	4.900	4.900	2.830	3.900	7.500	5.820	5.610	3.430	4.300	2.130	3.940
2	4.750	4.850	5.460	4.000	4.000	9.000	5.560	4.950	3.350	3.030	1.610	3.750
3	4.550	5.050	5.250	4.800	4.500	10.000	6.130	4.800	3.350	2.390	1.470	3.560
4	4.600	4.600	5.200	4.300	5.500	10.500	5.720	7.870	5.000	1.890	1.590	3.140
5	4.500	4.700	4.950	4.400	6.700	10.500	5.510	6.560	6.790	1.890	1.450	3.360
6	4.360	4.550	5.100	4.600	6.800	10.000	5.410	4.650	7.340	3.160	2.160	3.970
7	4.800	4.700	5.050	5.000	6.500	10.000	5.610	4.200	7.280	2.610	2.040	3.000
8	5.050	5.000	4.700	5.200	6.400	10.500	5.300	4.900	5.360	1.910	2.320	3.420
9	5.150	5.200	5.300	5.000	6.200	10.500	4.550	4.000	4.700	1.770	2.290	3.030
10	4.850	4.310	3.300	4.600	6.100	11.000	5.050	3.700	4.070	2.160	1.940	3.940
11	5.650	5.000	.618	3.900	6.300	11.500	5.820	3.600	3.390	2.490	1.980	4.000
12	5.200	5.050	2.020	3.600	6.500	11.500	5.870	3.600	3.300	2.060	2.110	4.240
13	5.050	5.300	5.150	2.200	6.900	11.000	6.240	3.800	3.520	1.830	1.830	5.740
14	5.150	5.360	3.300	1.200	7.500	11.600	6.030	3.700	2.960	1.630	1.470	5.180
15	5.300	5.360	3.090	.500	8.000	13.900	6.190	9.240	3.480	1.280	1.470	4.170
16	4.950	5.610	3.480	1.300	8.200	12.300	5.410	5.720	3.350	11.600	1.420	3.500
17	4.900	5.100	3.210	2.300	8.100	9.280	5.660	4.550	3.570	1.430	1.370	3.620
18	4.450	5.250	3.700	2.100	7.600	8.380	5.820	4.170	3.610	2.110	1.340	3.220
19	4.900	5.360	8.520	2.000	6.900	11.200	5.300	3.390	5.460	2.160	1.370	3.360
20	5.560	5.200	10.000	2.500	6.200	10.300	5.250	3.750	3.660	1.940	1.150	3.330
21	5.360	4.950	8.720	4.000	5.500	8.650	5.250	3.980	5.580	1.400	1.730	3.190
22	5.720	4.120	8.380	4.000	5.700	7.750	5.000	2.460	7.510	1.340	1.670	2.780
23	5.720	4.850	6.030	3.700	6.000	7.160	4.070	2.220	4.700	1.100	1.520	3.680
24	5.250	4.450	4.070	3.500	6.500	7.050	4.600	2.540	27.600	1.010	1.370	4.740
25	4.950	4.900	3.200	3.300	6.900	8.650	4.310	2.750	73.700	.972	1.520	4.300
26	4.700	5.150	2.600	3.100	7.000	8.920	4.360	2.300	23.600	1.050	1.490	4.700
27	5.100	4.800	2.300	2.900	7.000	7.100	4.550	3.130	12.600	.948	1.830	4.410
28	5.000	4.750	2.100	2.700	7.100	7.050	5.200	3.130	9.950	.948	2.700	4.480
29	5.150	5.150	1.980	2.600		6.830	5.920	2.880	6.600	.984	2.290	4.240
30	4.700	5.250	1.780	2.700		6.400	8.130	3.660	5.140	.960	3.220	3.940
31	4.410		2.380	2.900		5.980		3.750		1.590	3.590	

SOUTH PLATTE RIVER AT JULESBURG, COLORADO

Samples are taken at the Julesburg sewage treatment plant one mile east of the city. This station is located two miles above the Colorado-Nebraska State line. The principal agricultural crop in the area is sugar beets. A beet sugar refinery at Ovid, Colorado discharges a BOD population equivalent of 110,000 to the stream about eight miles above the station during the October through January processing season. Return flows from extensive developments of irrigated agriculture are reflected in relatively high concentrations of dissolved salts.

A summary of the first two years coliform data from Julesburg is shown below. The high autumn and winter values correspond with the sugar beet processing season.

Water Year	Median Coliform Levels/100 ml. 1962	1963
Autumn	16,000*	25,000
Winter	100	20,000
Spring	1,000	1,700
Summer	500	1,600

*Single value

Station Location:	South Platte River at Julesburg, Colorado
Major Basin:	Missouri River
Minor Basin:	South Platte River
Station at:	40°59' Latitude 102°14' Longitude
Miles above mouth:	87
Activation Date:	June 12, 1961
Sampled by:	Northeast Colorado Health Department
Field Analysis by:	Northeast Colorado Health Department U.S. Public Health Service
Other Cooperating Agencies:	Colorado State Department of Health
Hydrologic Data:	
Nearest pertinent gaging station:	At Julesburg, Colorado
Gaging station operated by:	U.S. Geological Survey
Drainage area at gaging station:	23,138 square miles
Period of record:	1902 to present
Average discharge in record period:	464 cfs.
Maximum discharge in record period:	31,300 cfs.
Minimum discharge in record period:	0

Remarks: Flows influenced by transmountain diversions, irrigation diversions for about 1 1/4 million acres, and operations of reservoirs and power plants.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.52	.85
	Na	178	170
	K	21	16
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	*31	*37
	Cd	*15	*37
	As	*50	*50
	B	277	110
	P	*39	*50
	Fe	46	*74
	Mo	15	*50
	Mn	*7.7	*10
	Al	—	*74
	Be	*.4	*.92
	Cu	*15	*37
	Ag	*3.1	*9.2
	Ni	*15	*37
	Co	*31	*37
	Pb	*39	*50
	Cr	*8	*50
	V	*15	184
	Ba	31	92
	Si	1000	626

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	.8	.3	April to June	1.7	.3
January to March	—	—	July to September	—	—

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCl_4, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.
See page 21.

RADIOACTIVITY DETERMINATIONS

STATE COLORADO
MAJOR BASIN MISSOURI RIVER
MINOR BASIN SOUTH PLATTE RIVER
STATION LOCATION SOUTH PLATTE RIVER AT JULESBURG, COLORADO

92

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON				
			DATE OF DETERMINATION	ALPHA					BETA						DATE OF DETERMINATION	GROSS ACTIVITY			
				SUSPENDED		DISSOLVED		TOTAL	SUSPENDED		DISSOLVED		TOTAL			ALPHA		BETA	
MO	DAY	YR	MO	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO	DAY	pc/g	±	pc/g	±
10	1	62	10	22	0	2	54	16	54	16	17	13	78	21	95	25						
10	8	62	11	2	5	5	56	22	61	23	44	64	129	92	173	112						
10	15	62	12	22	2	2	40	14	42	14	4	16	102	32	106	37						
11	7	62	12	13	0	3	18	8	20	9	98	16	252	48	290	60						
11	26	62	12	21	0	3	36	13	41	13	10	32	104	43	122	50						
12	4	62	12	31	3	3	41	14	44	14	27	19	100	26	127	32						
12	19	62	1	9	3	3	36	12	39	12	41	36	41	44	82	57						
12	27	62	1	14	0	2	32	13	32	13	18	16	62	23	80	28						
1	3	63	1	16	3	3	32	12	35	12	22	32	88	45	110	55						
1	7	63	2	5	3	3	40	13	43	13	14	30	99	43	113	52						
1	21	63	2	1	0	4	58	17	58	17	34	32	80	41	114	52						
1	28	63	2	11	0	3	23	14	23	14	9	16	91	24	100	29						
2	4	63	2	18	3	5	28	12	31	13	119	19	107	21	226	28						
2	11	63	2	21	6	4	35	13	41	14	33	39	64	47	97	61						
2	25	63	3	14	2	2	37	13	39	13	10	31	79	44	89	54						
3	5	63	3	20	2	3	37	12	39	15	53	34	44	40	97	52						
3	11	63	3	25	6	5	38	23	44	14	54	21	69	24	123	32						
3	18	63	4	1	2	3	62	16	64	16	41	17	70	21	111	27						
3	27	63	4	10	0	2	38	14	38	14	26	31	84	42	110	52						
4	1	63	4	25	0	2	1	5	1	5	9	29	56	39	65	49						
4	8	63	4	25	3	3	11	8	14	9	20	30	119	43	139	52						
4	16	63	4	29	0	2	30	12	30	12	8	14	95	21	103	25						
4	22	63	5	6	0	2	49	17	49	17	24	14	143	24	167	28						
4	29	63	5	15	0	2	17	13	17	13	2	27	84	43	86	51						
5	6	63	5	27	0	2	38	10	38	10	42	15	141	23	183	27						
5	13	63	5	27	0	2	24	10	24	10	2	14	67	20	69	24						
5	17	63	6	5	1	1	29	11	30	11	16	6	79	41	95	41						
5	27	63	6	12	0	1	38	14	38	14	17	6	93	44	110	44						
6	17	63	7	1	0	1	19	11	19	11	16	3	104	35	120	35						
6	25	63	7	10	0	0	38	13	38	13	6	5	82	41	88	41						
7	2	63	7	15	1	1	23	11	24	11	6	3	58	21	64	21						
7	9	63	7	24	0	0	22	10	22	10	4	6	63	41	67	41						
7	16	63	8	7	1	1	37	16	38	16	25	7	93	44	118	45						
7	20	63	8	7	0	0	35	15	35	15	8	6	50	45	58	45						
7	30	63	8	19	1	1	29	12	30	12	7	3	64	42	71	42						
8	7	63	8	19	1	1	32	12	33	12	15	3	83	21	98	21						
8	14	63	8	27	0	1	34	13	34	13	4	6	57	42	61	42						
8	28	63	9	16	0	0	16	10	16	10	3	3	45	21	48	21						
9	10	63	10	1	0	0	28	12	28	12	4	3	54	39	58	39						
9	16	63	10	1	0	0	21	13	21	13	7	3	42	25	49	25						
9	23	63	10	8	1	1	33	18	34	18	14	6	69	47	83	47						
9	30	62	10	17	14	10	45	15	59	18	45	71	67	43	112	83						

PLANKTON POPULATION

STATE COLORADO

MAJOR BASIN MISSOURI RIVER

MINOR BASIN SOUTH PLATTE RIVER

STATION LOCATION SOUTH PLATTE RIVER AT JULESBURG, COLORADO 092

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA (Number per ml.)	MICROINVERTEBRATES																			
			1ST		2ND		3RD		4TH				PROTOZOA (Identifiable) (Number per ml.)	ROTIFERS										CRUSTACEA							NEMATODES (Identifiable) (Number per liter)	OTHER ANIMAL FORMS (Number per liter)
														NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)										NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes)							
															1ST		2ND		3RD		4TH		5TH			1ST		2ND		3RD			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT				GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	1	62	65	14	92	12	12	8	46	6	60	-	-	0											0						0	0
10	15	62	64	26	71	15	26	11	46	8	40	-	-	0											0						0	0
11	13	62	12	13	71	8	92	7	65	7	65	-	-	0											0						0	0
12	4	62	12	35	92	17	71	9	46	7	32	-	-	1											0						2	0
12	19	62	12	36	92	13	71	11	36	9	31	-	-	-											-						-	-
1	7	63	65	28	70	18	46	5	1	4	45	-	-	0											0						0	0
1	21	63	12	13	65	12	86	8	53	5	62	-	-	0											0						0	0
2	4	63	46	12	92	11	36	7	74	6	64	130	-	0											0						0	0
2	18	63	36	13	71	13	46	9	92	8	57	-	-	0											0						0	0
3	5	63	12	23	71	16	92	13	46	7	41	-	-	0											0						0	0
3	27	63	71	20	65	15	46	15	92	8	42	-	-	0											0						0	0
4	1	63	65	21	92	19	71	9	36	7	44	-	-	0											0						0	0
4	16	63	26	35	70	15	64	9	71	7	34	-	-	1											15	50	2	76	2		0	0
5	6	63	71	57	92	8	36	5	12	5	25	-	-	-											-						-	-
5	17	63										-	-	-											-						-	-
6	3	63	65	33	26	25	70	14	71	6	22	-	-	-											-						-	-
6	17	63	70	28	64	22	71	9	26	7	34	-	-	-											-						-	-
8	7	63										-	-	-											-						-	-
8	28	63										-	-	-											-						-	-
9	10	63										-	-	-											-						-	-
9	16	63										-	-	-											-						-	-

PLANKTON POPULATION

STATE COLORADO

MAJOR BASIN MISSOURI RIVER

MINOR BASIN SOUTH PLATTE RIVER

STATION LOCATION SOUTH PLATTE RIVER AT JULESBURG, COLORADO

92

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	1	62	6900	20	290	750	0	110	0	700	5020	560	5270	87	4	88	3	92	3	78	2	38	2	91	2	68	2	17	1	66	1	69	1
10	15	62	3400	0	0	100	0	60	0	410	2810	10	1060	87	3	88	3																
11	13	62	2000	0	0	100	0	0	0	210	1700	20	170	88	2	78	1	87	1	91	1												
12	4	62	1800	0	0	0	0	0	0	50	1760	70	1530	78	3	92	2	88	1														
12	19	62	2100	0	0	0	0	0	0	40	2070	130	2640	78	3	88	1	87	1	92	1	82	1										
1	7	63	1300	0	0	20	0	20	0	130	1140	40	2160	87	2	88	2																
1	21	63	1900	0	0	40	0	0	0	60	1760	0	170	87	2	88	2	78	1														
2	4	63	1900	0	170	40	0	0	0	80	1600	460	6380	88	2	92	1																
2	18	63	400	0	0	0	0	20	50	50	330	90	690																				
3	5	63	1800	0	0	20	0	0	20	70	1670	0	3230	78	2	88	2	87	1	92	1												
3	27	63	1700	0	0	20	0	110	70	220	1320	40	2680	88	2	87	2																
4	1	63	3100	0	20	20	0	90	0	1910	1080	130	1390	87	1	92	1	88	1														
4	16	63	6000	0	230	190	0	80	150	2060	3320	190	1390	68	4	88	4	87	3	85	2	91	1	15	1	92	1						
5	6	63	10200	0	0	0	0	40	0	1510	8690	210	3990	88	6	92	3	87	2	82	2	78	2	69	1	97	1	74	1				
5	17	63	18500	0	0	0	0	170	0	3610	14740	550	8230																				
6	3	63	4000	0	0	110	0	70	0	1280	2600	350	7370	87	4	68	3	88	3														
6	17	63	1200	0	20	140	0	50	0	430	520	50	520	88	2	68	1	87	1	71	1												
8	7	63	2500	0	0	80	0	40	0	770	1620	40	210																				
8	28	63	2700	0	0	720	0	0	0	1850	650	280	470	38	1																		
9	10	63	400	0	0	90	0	0	0	170	130	170	130																				
9	16	63	1100	0	0	160	0	140	0	410	380	0	140																				

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE COLORADO

MAJOR BASIN MISSOURI RIVER

MINOR BASIN SOUTH PLATTE RIVER

STATION LOCATION SOUTH PLATTE RIVER AT JULESBURG, COLORADO

92

DATE OF SAMPLE					GALLONS FILTERED	EXTRACTABLES			CHLOROFORM EXTRACTABLES									
BEGINNING			END								NEUTRALS							
MONTH	DAY	YEAR	MONTH	DAY		TOTAL	CHLORO-FORM	ALCOHOL	ETHER INSOLUBLES	WATER SOLUBLES	TOTAL	ALIPHATICS	AROMATICS	OXYGEN-ATED COMPOUNDS	LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	8	62	10	24	7400#	137	16	121	0	5	5	0	0	5	0	2	1	0	3
12	27	62	1	7	5000#	239	33	206	1	10	7	1	1	5	0	4	3	0	8
2	11	63	2	25	5000#	19	5	14	–	–	–	–	–	–	–	–	–	–	–
3	27	63	4	8	5000#	189	32	157	3	9	9	2	1	5	1	3	3	0	5
5	17	63	5	27	200*	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6	17	63	7	18	217*	–	–	–	–	–	–	–	–	–	–	–	–	–	–

\# ESTIMATED

* LOW FLOW

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE COLORADO

MAJOR BASIN MISSOURI RIVER

MINOR BASIN SOUTH PLATTE RIVER

STATION LOCATION SOUTH PLATTE RIVER AT JULESBURG, COLORADO

92

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	1	62	15.5	5.9	8.0	1.9	-	-	-	-	64	230	690	5	*25	825	.1	1550	1900
10	8	62	16.6	4.4	8.0	2.2	-	-	-	-	57	240	690	5	*25	800	.4	1520	6700
10	15	62	-	-	7.9	-	-	-	-	-	68	254	720	5	*25	680	.5	1576	15000
10	23	62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23000
11	13	62	-	-	8.0	-	-	-	-	-	68	272	712	5	*25	750	.0	1560	25000
11	26	62	6.6	9.2	7.9	6.9	-	-	-	-	48	258	716	0	*25	750	.6	1570	100000
12	4	62	3.7	7.3	7.7	5.7	-	-	-	-	93	262	730	0	*25	750	.0	1650	45000
12	19	62	4.8	9.0	7.9	4.8	-	-	-	-	66	264	680	0	*25	725	.3	1520	-
12	27	62	1.0	9.2	7.7	3.2	-	-	-	-	65	288	780	-	*25	775	.2	1590	54000
1	3	63	4.0	9.2	7.8	7.6	-	-	-	-	47	262	730	-	*25	688	.2	1450	-
1	7	63	3.0	5.9	7.6	3.7	-	-	-	-	58	270	700	-	*25	725	.5	1550	64000
1	21	63	.0	8.8	7.9	4.0	-	-	-	-	68	268	750	-	*25	700	.1	1550	-
1	28	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10000
2	4	63	1.6	8.9	7.8	7.7	-	-	-	-	55	240	630	-	150	625	.3	1350	26000
2	11	63	1.7	3.7	7.8	3.6	-	-	-	-	59	262	680	10	*25	775	.2	1490	24000
2	18	63	2.8	10.2	7.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2	25	63	1.1	10.5	7.8	-	-	-	-	-	59	260	710	5	*25	725	.0	1500	-
3	5	63	2.2	8.5	7.6	4.7	-	-	-	-	56	260	730	5	130	750	.2	1500	9300
3	11	63	7.2	8.5	7.6	4.9	-	-	-	-	56	250	770	0	190	825	.4	1770	33000
3	18	63	3.3	10.4	7.6	3.8	-	-	-	-	58	260	700	5	160	690	.2	1620	14000
3	27	63	10.0	9.0	7.6	2.3	-	-	-	-	42	260	760	5	*25	650	.1	1460	1300
4	1	63	15.5	7.7	7.6	-	-	-	-	-	64	250	740	5	*25	650	.0	1390	1400
4	8	63	4.4	8.4	7.6	1.9	-	-	-	-	60	230	740	5	*25	720	.0	1450	-
4	16	63	7.2	8.1	7.3	2.2	-	-	-	-	66	230	720	5	*25	750	.0	1470	11000
4	22	63	-	-	7.4	-	-	-	-	-	78	240	780	5	*25	720	.0	1500	500
4	29	63	6.7	10.4	7.6	5.5	-	-	-	-	70	228	760	5	*25	720	.0	1430	1700
5	6	63	23.9	7.3	7.6	3.7	-	-	-	-	78	220	700	5	*25	720	.0	1500	4700
5	13	63	23.9	6.4	7.6	3.9	-	-	-	-	68	200	760	5	*25	650	.0	1410	-
5	17	63	23.3	6.8	7.6	-	-	-	-	-	60	200	660	5	*25	630	.1	1330	-
5	27	63	25.0	8.8	7.6	.8	-	-	-	-	54	200	740	10	*25	730	.0	1450	2000
6	3	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	5	63	23.3	8.9	7.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	17	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6	25	63	29.4	9.2	7.6	1.7	-	-	-	-	78	230	740	10	*25	650	.0	1400	1500
7	2	63	31.1	9.6	7.6	1.8	-	-	-	-	62	196	700	0	*25	720	.0	1460	100
7	9	63	31.1	8.6	7.6	.9	-	-	-	-	64	170	660	0	*25	650	.0	1390	1800
7	16	63	23.3	6.0	7.6	2.5	-	-	-	-	76	192	700	0	*25	700	.0	1420	1300
7	22	63	23.8	6.2	7.6	-	-	-	-	-	68	230	680	10	*25	760	.1	1330	1000
											64	230	700	5	*25	760	.0	1430	-

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE COLORADO
MAJOR BASIN MISSOURI RIVER
MINOR BASIN SOUTH PLATTE RIVER
STATION LOCATION SOUTH PLATTE RIVER AT JULESBURG, COLORADO

92

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
7	30	63	31.1	10.3	7.6	-	-	-	-	-	72	174	660	10	*25	700	.0	1350	900
8	7	63	-	-	-	-	-	-	-	-	66	220	720	5	*25	720	.0	1400	-
8	12	63	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2000
8	14	63	31.1	8.8	7.6	3.1	-	-	-	-	80	220	370	5	*25	720	.0	1530	-
8	28	63	27.2	6.0	7.6	2.2	-	-	-	-	74	174	680	5	*25	730	.0	1430	16000
9	10	63	28.9	8.2	7.6	-	-	-	-	-	70	160	700	0	*25	850	.0	1370	-
9	16	63	25.6	7.6	7.6	1.3	-	-	-	-	48	176	680	10	*25	730	.0	1420	200
9	23	63	23.9	7.3	7.6	1.6	-	-	-	-	76	210	700	5	*25	800	.0	1600	4900
9	30	63	19.4	7.4	7.6	2.4	-	-	-	-	50	250	720	10	900	800	.0	1510	-

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station at Julesburg, Colorado
Data Supplied by State of Colorado Department of Water Resources

STATE	Colorado
MAJOR BASIN	Missouri River
MINOR BASIN	South Platte River
STATION LOCATION	South Platte River at Julesburg, Colorado

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	.239	.360	.348	.320	.360	.462	.281	.046	.142	.023	.020	.023
2	.278	.356	.338	.335	.360	.456	.247	.049	.128	.020	.023	.019
3	.297	.357	.337	.362	.450	.492	.222	.042	.120	.020	.024	.018
4	.286	.354	.335	.392	.600	.590	.220	.045	.111	.021	.023	.016
5	.253	.354	.327	.367	.800	.617	.226	.086	.101	.027	.063	.017
6	.285	.352	.332	.326	.900	.681	.233	.109	.087	.027	.034	.018
7	.338	.346	.337	.311	1.000	.750	.223	.076	.072	.026	.030	.018
8	.353	.341	.335	.356	1.030	.819	.194	.066	.060	.024	.045	.016
9	.334	.344	.338	.388	.890	.877	.184	.062	.062	.019	.046	.016
10	.334	.345	.344	.363	.771	.904	.194	.050	.048	.020	.043	.018
11	.352	.341	.334	.250	.720	.933	.229	.042	.035	.019	.038	.018
12	.360	.344	.332	.210	.680	.940	.209	.045	.035	.025	.031	.017
13	.360	.336	.341	.240	.650	.925	.169	.044	.033	.211	.023	.021
14	.357	.342	.334	.260	.622	.925	.138	.040	.032	.084	.021	.023
15	.363	.342	.337	.270	.605	.930	.129	.042	.036	.045	.023	.024
16	.360	.352	.335	.280	.578	.940	.125	.041	.071	.041	.023	.026
17	.365	.354	.333	.280	.563	.884	.113	.047	.047	.031	.023	.026
18	.360	.350	.333	.260	.561	.863	.097	.051	.037	.026	.024	.024
19	.360	.352	.334	.210	.559	.869	.089	.053	.031	.022	.020	.022
20	.378	.349	.348	.230	.549	.858	.083	.046	.027	.023	.020	.024
21	.382	.349	.356	.260	.538	.851	.065	.041	.021	.023	.021	.040
22	.376	.344	.344	.270	.526	.860	.060	.039	.023	.023	.021	.062
23	.370	.342	.318	.240	.519	.857	.056	.039	.021	.023	.021	.095
24	.346	.344	.298	.240	.498	.825	.051	.045	.020	.022	.019	.076
25	.336	.345	.292	.250	.479	.810	.048	.042	.021	.021	.020	.147
26	.355	.345	.160	.240	.460	.670	.048	.037	.022	.023	.020	.622
27	.357	.335	.180	.230	.466	.645	.046	.035	.022	.022	.021	.618
28	.358	.330	.195	.230	.466	.576	.046	.031	.021	.020	.021	.573
29	.360	.336	.210	.250		.494	.048	.028	.022	.023	.018	.492
30	.358	.338	.230	.280		.478	.046	.029	.022	.023	.018	.450
31	.364		.270	.320		.315		.166		.020	.019	

YELLOWSTONE RIVER NEAR SIDNEY, MONTANA

The Sidney station of the Public Health Service Water Pollution Surveillance System is located about 5 miles above the Montana-North Dakota State line, and approximately 25 miles above the junction of the Yellowstone River with the Missouri River. Samples are taken from the intake of the Lewis and Clark station of the Montana-Dakota Utilities Company.

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Station Location: Yellowstone River near Sidney, Montana

Major Basin: Missouri River

Minor Basin: Yellowstone River

Station at: 47°45' Latitude 104°06' Longitude

Miles above mouth: 30

Activation Date: November 3, 1958

Sampled by: Montana-Dakota Utilities Company

Field Analysis by: Montana-Dakota Utilities Company

Other Cooperating Agencies: Montana State Board of Health

Hydrologic Data:

Nearest pertinent gaging station: Near Sidney, Montana

Gaging station operated by: U.S. Geological Survey

Drainage area at gaging station: 68,812 square miles

Period of record: 1910-31 - 1933 to present

Average discharge in record period: 12,770 cfs.

Maximum discharge in record period: 159,000 cfs.

Minimum discharge in record period: 470 cfs.

Remarks: Irrigation diversions for approximately 1 1/4 million acres made above station.

ALKYL BENZENE SULFONATE (ABS)

Date	mg/l

ELEMENTAL ANALYSES

		Composite Interval 10/1/62 to 12/31/62	Composite Interval 4/1/63 to 6/30/63
Analysis by wet or flame methods. Results in mg/l	F	.62	.60
	Na	78	58
	K	5.5	5.2
Analysis by Spectrographic methods. Results in micrograms per liter	Zn	11	32
	Cd	5	*5
	As	*50	*45
	B	152	189
	P	*27	*23
	Fe	54	*9
	Mo	54	*11
	Mn	1.1	*4.4
	Al	-	*23
	Be	*.14	*.11
	Cu	*3	16
	Ag	*1.1	*1.1
	Ni	*3	*5
	Co	*11	*5
	Pb	*27	*11
	Cr	*3	*11
	V	*5	*23
	Ba	52	52
	Sr	354	281

*Actual value is less than the amount shown. Reported result indicates limit of sensitivity at which test was performed. See text for explanation.

STRONTIUM 90 ACTIVITY

Composite Interval	pc/l	±	Composite Interval	pc/l	±
October to December	2.0	.4	April to June	-	-
January to March	-	-	July to September	5.0	.5

± at 95% Confidence Limits

SPECIFIC QUALITATIVE IDENTIFICATIONS FROM CARBON ADSORPTION EXTRACTS WATER YEAR 1962-3

Interval	Compound	Concentration* ug/l

*Concentration values, where shown, are calculated from quantitative gas chromatographic analysis of the aromatic fractions of CCE, and may be assigned the units of ug/l. In light of the unknown efficiency of carbon adsorption sampling for these compounds, the reported values represent minima, the actual values being equal to or greater than the reported values.

See page 21.

RADIOACTIVITY DETERMINATIONS

STATE MONTANA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN YELLOWSTONE RIVER

STATION LOCATION YELLOWSTONE RIVER NEAR SIDNEY, MONTANA

55

DATE SAMPLE TAKEN			RADIOACTIVITY IN WATER												RADIOACTIVITY IN PLANKTON				
			DATE OF DETERMINATION		ALPHA						BETA						DATE OF DETERMINATION		GROSS ACTIVITY			
					SUSPENDED		DISSOLVED		TOTAL		SUSPENDED		DISSOLVED		TOTAL				ALPHA		BETA	
MO	DAY	YR	MO	DAY	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	pc/l	±	MO	DAY	pc/g	±	pc/g	±
10	2	62	10	25	-	-	-	-	-	-	408	338	44	19	452	339						
10	8	62	11	28	-	-	-	-	-	-	21	14	14	11	35	18						
10	15	62	11	8	-	-	-	-	-	-	41	110	16	17	57	111						
10	22	62	11	19	3	3	3	3	6	4	2	7	16	6	18	9						
10	29	62	12	27	-	-	-	-	-	-	0	12	31	17	31	21						
11	26	62	12	19*	0	1	3	3	3	3	9	9	35	14	40	17						
12	31	62	1	30*	0	1	4	3	4	3	6	7	33	18	39	19						
1	28	63	2	20*	0	1	3	3	3	3	7	13	16	17	23	21						
2	25	63	3	15*	1	1	4	3	5	3	43	15	42	16	85	22						
3	25	63	4	17*	13	6	2	2	15	6	80	22	44	17	124	28						
4	22	63	5	22*	13	11	3	3	16	12	197	79	53	18	250	81						
5	27	63	6	19*	46	28	2	2	50	28	440	76	36	13	476	77						
6	24	63	7	23*	35	30	2	2	37	30	496	80	41	7	537	88						
7	29	63	8	23*	15	8	2	2	17	8	141	35	37	15	178	29						
8	26	63	9	25*	1	2	3	3	4	4	71	17	39	16	110	23						
9	30	63	10	31*	7	17	4	4	11	17	239	91	45	18	284	93						

PLANKTON POPULATION

STATE MONTANA
MAJOR BASIN MISSOURI RIVER
MINOR BASIN YELLOWSTONE RIVER
STATION LOCATION YELLOWSTONE RIVER NEAR SIDNEY, MONTANA 055

DATE OF SAMPLE			DOMINANT SPECIES OF DIATOMS AND PERCENT OF TOTAL DIATOMS (See text for Codes)									FUNGI AND SHEATHED BACTERIA Number per ml.
			1ST		2ND		3RD		4TH			
MONTH	DAY	YEAR	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	SPECIES	PERCENT	OTHER SPECIES PERCENT	
10	2	62										-
10	15	62										0
11	5	62	92	47	36	17	65	9	47	7	20	0
11	16	62	92	34	36	18	65	11	66	7	30	40
12	3	62	92	59	36	19	65	6	71	3	13	170
12	17	62	92	42	36	15	53	7	71	6	30	0
1	7	63	92	33	65	12	36	10	71	4	41	0
1	21	63										30
2	4	63										0
2	18	63	65	19	92	13	36	11	16	6	51	0
3	4	63										-
3	18	63										0
4	1	63	36	23	92	20	65	9	86	7	41	-
4	16	63										-
5	6	63										-
5	20	63										-
6	3	63										-
6	17	63										-
8	5	63										-
8	19	63										-
9	2	63										-

DATE OF SAMPLE			MICROINVERTEBRATES																				
			PROTOZOA (Identifiable) Number per ml.	ROTIFERS											CRUSTACEA							NEMATODES (Identifiable) Number per liter	OTHER ANIMAL FORMS (Number per liter)
				NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD		4TH		5TH		NUMBER PER LITER	GENERA AND COUNT LEVEL (See text for Codes) 1ST		2ND		3RD			
MONTH	DAY	YEAR			GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL		
10	2	62	--	-											-							-	-
10	15	62	--	-											-							-	-
11	5	62	--	0											0							1	0
11	16	62	0	0											0							0	0
12	3	62	0	0											0							0	0
12	17	62	--	-											-							-	-
1	7	63	0	0											0							0	0
1	21	63	0	0											0							0	0
2	4	63	0	0											0							0	0
2	18	63	0	0											0							0	0
3	4	63	-	-											-							-	-
3	18	63	-	-											-							-	-
4	1	63	-	0											0							0	0
4	16	63	-	-											-							-	-
5	6	63	-	-											-							-	-
5	20	63	-	-											-							-	-
6	3	63	-	-											-							-	-
6	17	63	-	-											-							-	-
8	5	63	-	-											-							-	-
8	19	63	-	-											-							-	-
9	2	63	-	-											-							-	-

PLANKTON POPULATION

STATE MONTANA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN YELLOWSTONE RIVER

STATION LOCATION YELLOWSTONE RIVER NEAR SIDNEY, MONTANA

DATE OF SAMPLE			ALGAE (Number per milliliter)									INERT DIATOM SHELLS		MOST ABUNDANT ALGAE - Genera and Count Level per ml. (See text for Codes)																	
			TOTAL	BLUE-GREEN		GREEN		FLAGELLATED (Pigmented)		DIATOMS				1ST		2ND		3RD		4TH		5TH		6TH		7TH		8TH		9TH		10TH	
MONTH	DAY	YEAR		COCCOID	FILAMENTOUS	COCCOID	FILAMENTOUS	GREEN	OTHER	CENTRIC	PENNATE	CENTRIC	PENNATE	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL	GENUS	COUNT LEVEL
10	2	62	-	-	-	-	-	-	-	-	-	-	-																		
10	15	62	00	0	0	0	0	0	0	0	40	0	0																		
11	5	62	1400	0	20	690	0	0	0	110	630	50	500	38	2	92	2	24	1												
11	16	62	2300	0	0	60	0	0	0	120	2090	0	170	92	3	87	2	82	2												
12	3	62	2600	0	100	40	0	0	0	0	2480	0	10	92	4	82	2	87	1												
12	17	62	300	0	0	0	0	0	0	50	250	20	270																		
1	7	63	00	0	0	0	0	0	0	0	20	0	110																		
1	21	63	00	0	20	0	0	0	0	0	30	0	130																		
2	4	63	00	0	0	0	0	0	0	20	30	0	50																		
2	18	63	200	0	0	0	0	0	110	20	80	40	150																		
3	4	63	200	0	0	0	0	0	0	0	240	0	330																		
3	18	63	300	0	0	0	0	80	0	40	190	20	1050																		
4	1	63	1000	0	0	70	0	70	0	260	590	20	1210	71	1																
4	16	63	1300	0	0	20	0	70	0	310	900	0	1010																		
5	6	63	00	0	0	0	0	0	0	0	40	0	20																		
5	20	63	1500	0	0	0	0	0	0	880	640	20	2000																		
6	3	63	700	0	0	0	0	0	0	220	530	40	2330																		
6	17	63	300	0	0	20	0	0	0	40	210	0	210																		
8	5	63	2900	50	30	1280	0	30	0	840	640	1110	1180	25	2	38	1	29	1	35	1										
8	19	63	2100	0	0	560	0	20	20	540	990	220	1270	25	2																
9	2	63	9000	270	90	4210	0	50	0	1970	2370	670	1660																		

ORGANIC CHEMICALS

RECOVERED BY CARBON FILTER TECHNIQUE

RESULTS IN MICROGRAMS PER LITER
(Parts per billion)

STATE MONTANA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN YELLOWSTONE RIVER

STATION LOCATION YELLOWSTONE RIVER NEAR SIDNEY, MONTANA

DATE OF SAMPLE BEGINNING MONTH	BEGINNING DAY	BEGINNING YEAR	END MONTH	END DAY	GALLONS FILTERED	EXTRACTABLES TOTAL	EXTRACTABLES CHLOROFORM	EXTRACTABLES ALCOHOL	CHLOROFORM EXTRACTABLES ETHER INSOLUBLES	CHLOROFORM EXTRACTABLES WATER SOLUBLES	NEUTRALS TOTAL	NEUTRALS ALIPHATICS	NEUTRALS AROMATICS	NEUTRALS OXYGENATED COMPOUNDS	NEUTRALS LOSS	WEAK ACIDS	STRONG ACIDS	BASES	LOSS
10	2	62	10	9	3500#	56	10	46	-	-	-	-	-	-	-	-	-	-	-
11	5	62	11	12	5000#	86	18	68	-	-	-	-	-	-	-	-	-	-	-
12	3	62	12	10	5000#	81	13	68	-	-	-	-	-	-	-	-	-	-	-
12	3	62		*	13500#	76	14	62	1	2	8	2	1	5	0	1	1	0	1
1	7	63	1	14	5000#	92	17	75	-	-	-	-	-	-	-	-	-	-	-
2	4	63	2	11	5000#	132	38	94	1	13	13	1	1	10	1	4	2	1	4
3	4	63	3	11	5000#	130	36	94	-	-	-	-	-	-	-	-	-	-	-
4	1	63	4	8	5000#	67	20	47	1	5	7	1	1	5	0	2	1	0	4
5	6	63	5	13	3000#	68	19	49	-	-	-	-	-	-	-	-	-	-	-
6	3	63	6	10	2500#	75	27	48	1	8	10	2	1	7	0	3	2	0	3
7	1	63	7	8	2500#	109	40	69	-	-	-	-	-	-	-	-	-	-	-
8	5	63	8	12	4000#	93	33	60	0	9	13	4	2	6	1	4	2	1	4
9	2	63	9	9	2500#	55	17	38	-	-	-	-	-	-	-	-	-	-	-

ESTIMATED

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE MONTANA

MAJOR BASIN MISSOURI RIVER

MINOR BASIN YELLOWSTONE RIVER

STATION LOCATION YELLOWSTONE RIVER NEAR SIDNEY, MONTANA

55

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	DAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
10	8	62	13.8	-	8.4	-	-	-	-	-	-	152	258	-	1250	274	-	-	-
10	15	62	10.5	9.9	8.2	-	-	1.4	7.3	-	-	154	296	15	6250	235	-	648	-
10	22	62	10.5	10.6	8.4	-	-	1.4	3.8	-	-	146	270	6	400	132	-	562	-
10	29	62	8.8	10.8	8.3	-	-	1.1	3.6	-	-	154	275	2	80	183	-	-	-
11	5	62	7.0	-	8.7	-	-	-	-	-	-	146	282	-	55	204	-	576	-
11	12	62	5.5	-	8.4	-	-	-	-	-	-	176	292	-	40	225	-	606	-
11	19	62	8.0	10.1	8.5	-	-	.2	-	-	-	178	302	2	90	256	-	538	-
11	26	62	7.2	-	8.4	-	-	-	-	-	-	176	296	-	50	214	-	594	-
12	3	62	6.6	-	8.4	-	-	-	-	-	-	172	294	-	75	214	-	610	-
12	10	62	3.0	11.1	8.4	-	-	-	3.5	-	-	166	298	2	60	256	-	408	-
12	17	62	3.7	11.0	8.4	-	-	.7	3.6	-	-	172	286	3	170	193	-	590	-
12	31	62	2.8	-	7.8	-	-	1.2	-	-	-	200	348	-	25	244	-	706	-
1	7	63	5.3	11.0	7.9	-	-	1.2	3.6	-	-	208	356	2	45	291	-	708	-
1	14	63	5.2	-	8.1	-	-	-	-	-	-	188	312	-	30	229	-	498	-
1	21	63	6.5	-	8.2	-	-	-	-	-	-	208	412	-	35	328	-	814	-
1	28	63	6.0	-	8.1	-	-	-	-	-	-	252	404	-	35	340	-	884	-
2	4	63	4.0	10.1	8.1	-	-	2.2	4.8	-	-	220	356	3	35	256	-	716	-
2	11	63	.8	11.0	8.1	-	-	4.8	-	-	-	120	194	-	1100	181	-	420	-
2	18	63	3.4	-	8.2	-	-	-	-	-	-	136	232	-	110	153	-	452	-
2	25	63	3.4	10.5	8.2	-	-	2.6	6.7	-	-	176	300	10	75	174	-	524	-
3	4	63	11.5	10.6	8.2	-	-	3.7	-	-	-	140	240	-	900	174	-	402	-
3	11	63	9.8	11.1	8.2	-	-	3.4	8.3	-	-	176	300	-	1200	225	-	614	-
3	18	63	4.2	11.0	8.3	-	-	2.4	6.6	-	-	180	328	8	650	268	-	-	-
4	1	63	7.8	-	9.4	-	-	-	-	-	-	196	340	-	400	256	-	674	-
4	8	63	9.5	9.6	8.4	-	-	3.0	7.9	-	-	196	312	-	1800	352	-	652	-
4	15	63	19.6	8.5	8.3	-	-	2.7	6.0	-	-	180	320	-	1500	268	-	654	-
4	22	63	9.3	9.8	8.4	-	-	2.7	-	-	-	76	308	10	750	268	-	662	-
5	6	63	6.6	8.3	8.2	-	-	2.0	6.6	-	-	150	288	-	11000	260	-	636	-
5	13	63	12.3	-	8.2	-	-	-	-	-	-	136	228	-	4250	181	-	460	-
5	20	63	5.4	8.6	8.2	-	-	2.6	10.1	-	-	118	196	-	1000	160	-	270	-
5	27	63	19.2	8.0	9.1	-	-	2.1	-	-	-	104	144	-	850	40	-	230	-
6	3	63	19.0	-	7.7	-	-	-	-	-	-	80	116	-	2000	51	-	198	-
6	10	63	17.5	-	7.9	-	-	-	-	-	-	92	136	-	2500	61	-	368	-
6	17	63	20.2	-	7.9	-	-	-	-	-	8	78	116	-	2750	69	-	170	-
6	24	63	18.0	-	7.8	-	-	-	-	-	14	82	128	-	3250	62	-	120	-
7	8	63	25.0	-	8.2	-	-	-	-	-	14	100	156	-	700	104	-	326	-
7	15	63	23.8	-	8.1	-	-	-	-	-	16	100	170	-	1200	51	-	294	-
7	22	63	24.5	7.6	8.3	-	-	2.4	12.5	-	10	118	186	-	800	81	-	380	-
7	29	63	23.4	7.6	8.4	-	-	2.3	7.7	-	16	128	188	-	500	142	-	398	-

CHEMICAL, PHYSICAL AND BACTERIOLOGICAL ANALYSES

STATE MONTANA
MAJOR BASIN MISSOURI RIVER
MINOR BASIN YELLOWSTONE RIVER
STATION LOCATION YELLOWSTONE RIVER NEAR SIDNEY, MONTANA

55

DATE OF SAMPLE			TEMP. (Degrees Centigrade)	DISSOLVED OXYGEN mg/l	pH	B.O.D. mg/l	C.O.D. mg/l	CHLORINE DEMAND		AMMONIA-NITROGEN mg/l	CHLORIDES mg/l	ALKALINITY mg/l	HARDNESS mg/l	COLOR (scale units)	TURBIDITY (scale units)	SULFATES mg/l	PHOSPHATES mg/l	TOTAL DISSOLVED SOLIDS mg/l	COLIFORMS per 100 ml.
MONTH	JAY	YEAR						1-HOUR mg/l	24-HOUR mg/l										
8	5	63	24.2	8.1	8.5	-	-	1.7	-	-	22	140	216	-	250	132	-	446	-
8	12	63	24.6	-	8.5	-	17	-	-	-	22	150	242	-	110	183	-	510	-
8	19	63	23.6	-	8.4	-	16	-	-	-	26	162	256	-	900	280	-	600	-
8	26	63	23.4	8.5	8.5	-	-	2.2	-	-	22	164	254	-	200	266	-	364	-
9	2	63	20.0	-	8.3	-	-	-	-	-	28	162	270	-	200	225	-	602	-
9	9	63	21.3	-	8.4	-	-	-	-	-	32	170	314	-	2500	268	-	708	-
9	30	63	16.4	7.9	8.4	-	-	2.6	-	-	6	152	300	-	5500	291	-	644	-

STREAM FLOW DATA - 1962-1963

Thousand Cubic Feet per Second

PROVISIONAL--SUBJECT TO REVISION

Gaging Station near Sidney, Montana
Operated by U.S. Geological Survey

STATE: Montana

MAJOR BASIN: Missouri River

MINOR BASIN: Yellowstone River

STATION LOCATION: Yellowstone River near Sidney, Montana

Day	October	November	December	January	February	March	April	May	June	July	August	September
1	9.350	8.020	7.820	3.000	4.400	15.000	6.630	21.500	33.000	39.200	8.520	3.820
2	9.190	7.740	8.020	3.000	4.500	16.000	6.630	23.400	35.400	39.700	8.280	5.420
3	8.830	7.710	8.020	5.100	4.800	15.000	6.790	18.000	37.000	36.100	7.800	10.200
4	8.690	7.650	7.680	7.000	5.400	14.500	6.520	14.100	42.600	31.700	7.120	7.690
5	8.630	7.650	7.350	8.500	5.800	14.000	6.460	12.800	48.300	29.400	6.620	7.890
6	8.720	7.680	7.630	8.600	6.800	11.000	6.550	12.100	66.800	29.700	6.290	8.070
7	8.950	7.710	7.490	8.500	9.000	9.400	6.440	11.300	80.100	28.900	6.080	8.280
8	8.660	7.680	7.200	8.400	14.000	8.700	6.230	11.000	69.700	26.300	5.820	7.980
9	8.600	7.600	6.800	8.400	22.000	8.300	6.280	10.900	64.900	24.800	5.380	7.600
10	8.800	7.510	6.300	8.300	28.000	8.000	6.410	11.800	57.600	23.200	4.910	6.950
11	9.860	7.490	5.600	8.000	23.000	7.500	6.760	14.500	50.000	22.300	4.530	6.520
12	10.400	7.540	5.100	7.000	20.000	7.700	7.510	17.600	45.000	23.200	4.210	6.160
13	9.510	7.490	5.600	5.000	16.000	7.000	7.350	20.700	43.000	23.400	3.890	5.950
14	9.830	7.510	6.600	3.000	12.400	7.000	7.260	21.900	43.000	21.400	3.750	7.370
15	10.300	7.650	6.800	2.100	10.000	7.000	7.090	22.000	45.500	20.100	3.890	6.620
16	10.600	7.710	6.900	1.800	9.200	7.200	6.840	22.300	50.200	18.600	3.840	6.130
17	10.500	7.680	7.000	1.500	8.600	7.500	6.360	20.300	54.900	17.300	3.600	5.980
18	10.200	7.710	7.100	1.200	8.400	7.800	6.300	18.800	58.500	16.300	3.580	5.750
19	9.640	7.850	7.200	1.600	8.700	8.000	6.280	18.400	65.800	15.600	4.020	5.780
20	9.450	7.710	7.200	2.000	9.000	8.200	6.250	18.900	69.500	14.300	3.840	6.000
21	9.290	7.540	7.000	2.000	8.800	8.400	6.250	19.400	69.000	13.100	3.580	6.100
22	8.980	7.370	7.100	1.800	8.400	8.600	6.250	20.400	65.500	12.400	3.730	6.030
23	8.660	7.210	7.100	2.400	7.800	8.800	6.330	20.400	65.600	11.400	3.620	6.180
24	8.450	7.290	6.800	3.600	7.500	9.000	6.380	21.100	65.700	10.800	3.440	6.420
25	8.310	7.680	6.000	4.200	7.800	9.100	6.360	21.700	64.000	10.300	3.510	7.600
26	8.220	7.880	5.400	4.800	8.500	8.500	6.380	22.600	57.700	9.820	4.090	10.900
27	8.080	7.680	4.800	4.800	10.000	7.510	6.380	23.900	50.900	9.430	4.180	10.100
28	7.880	7.510	4.000	4.700	14.000	7.540	6.410	26.400	46.300	9.400	4.320	9.540
29	7.880	7.820	3.200	4.600		7.600	6.900	30.100	44.000	8.650	3.930	9.680
30	7.930	8.080	2.800	4.500		7.460	7.600	33.100	41.200	8.620	3.910	9.100
31	8.050		3.000	4.400		6.900		33.400		8.620	3.860	

U.S. GOVERNMENT PRINTING OFFICE : 1964 O - 736-408